



FACILITY FORM 802

N66-81220

(ACCESSION NUMBER)

135

(PAGES)

CR65 147

(NASA CR OR TMX OR AD NUMBER)

(THRU)

NONE

(CODE)

(CATEGORY)

MARTIN COMPANY

APPENDIX J
DRAWINGS AND SPECIFICATIONS
FOR
LUNAR ROCK CORING DEVICE
DESIGN STUDY

October 1965

Prepared under Contract No. NAS 9-3542 by

MARTIN COMPANY
Baltimore, Maryland 21203

LIST OF DRAWINGS AND SPECIFICATIONS

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>N/A</u>
Lunar Core Drill Assembly (Major Subassemblies)	11374-1	-
Power Drive Assembly (Complete Gear Train)	11374-2	-1
Drive Spindle Assembly (Percussion Mechanism)	11374-3	-1
Control Box Assembly (Electrical Controls)	11374-4	-1
Switch Mounting Bracket (Upper Limit Switch)	11374-5	-1
Switch Mounting Bracket (Lower Limit Switch)	11374-6	-1
3/8-16 Wing Nut (Percussor Housing Cover)	11374-7	-1
Roller (Feed Pinion Shaft)	11374-8	-64
Switch Cut-Off Bracket (Upper Limit Switch)	11374-9	-1
Switch Cut-Off Bracket (Lower Limit Switch)	11374-10	-1
Control Box Mounting Bracket (Electrical Controls)	11374-11	-1
Tubing Clamp (Stabilizing Leg)	11374-12	-1
Pin (Feed Pinion & 3rd Interm. Shafts)	11374-13	-64, -66
Roller (Gear Shift)	11374-14	-2
Compression Spring (Gear Shift)	11374-15	-2
Shift Lever (Gear Shift)	11374-16	-2
Eccentric Shaft (Gear Shift)	11374-17	-2
Control Box Cover (Electrical Controls)	11374-18	-4
Control Box (Electrical Controls)	11374-19	-4
Motor Material List (Motor)	11374-20	-2
Rear Plate (Gear Box)	11374-21	-2
Front Plate (Gear Box)	11374-22	-2
Bottom Plate (Gear Box)	11374-23	-2
Top Plate (Gear Box)	11374-24	-2

LIST OF DRAWINGS AND SPECIFICATIONS (Continued)

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>N/A</u>
Brush Assembly (Motor)	11374-25	-2
1st Intermediate Feed Gear (Gear Box)	11374-26	-77
Intermediate Pinion (Gear Box)	11374-27	-77
Spindle (Gear Box)	11374-28	-2
Bevel Gear Housing (Gear Box)	11374-29	-2
Bearing Retainer (Bevel Gear Drive)	11374-30	-2
Spindle Bearing Cap (Gear Box Drive Output)	11374-31	-2
Shifter Plate (Gear Box)	11374-32	-2
End Plate (Gear Box)	11374-33	-2
2nd Intermediate Shaft (Gear Box)	11374-34	-67
3rd Intermediate Shaft (Gear Box)	11374-35	-66
Feed Pinion Shaft (Gear Box)	11374-36	-64
Bearing Adapter Bushing (Feed Pinion & 3rd Interm. Shafts) . .	11374-37	-64, -66
2nd Intermediate Bushing (Gear Box)	11374-38	-67
Spacer (Feed Pinion Shaft)	11374-39	-64
Brush Holder (Motor)	11374-40	-53
Cover Plate (Bevel Gear Housing)	11374-41	-2
Slip Clutch Retainer (Vertical Drive)	11374-42	-106
Slip Clutch Lining (Vertical Drive)	11374-43	-106
Rolled Flanged Eyelet (Motor Brush Holder)	11374-44	-53
Brush Holder Plate (Motor)	11374-45	-53
Shoulder Rivet (Motor Brush Holder)	11374-46	-53
Brush Spring (Motor Brush Holder)	11374-47	-53
Shifting Gear (Gear Box)	11374-48	-2
Idler Gear (Gear Box)	11374-49	-2
Spindle Output Gear (Gear Box)	11374-50	-2

LIST OF DRAWINGS AND SPECIFICATIONS (Continued)

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>N/A</u>
1st Intermediate Pinion (Gear Box)	11374-51	-77
2nd Intermediate Feed Gear (Gear Box)	11374-52	-67
S. A. Brush Holder Plate (Motor)	11374-53	-2
Guide Post Bearing (Vertical Stabilizing Column)	11374-54	-2
Collar (Idler Gear - Gear Box)	11374-55	-2
Drill Bit Spline Assembly (Spindle Adapter to Drill String)	11374-56	-1
Rack Pinion (Vertical Drive)	11374-57	-2
Guide Post Spacer (Vertical Drive/Stabilizer Columns)	11374-58	-1
Feed Shaft Worm Gear (Gear Box)	11374-59	-64
Feed Rack (Vertical Drive)	11374-60	-1
Feed Rack Plate (Vertical Drive)	11374-61	-1
Main Support Column (Vertical Drive)	11374-62	-1
Stabilizer External Assembly (Stabilizing Leg)	11374-63	-1
Feed Pinion Shaft Assembly (Gear Box)	11374-64	-2
Base (Vertical Drive/Stabilizer Column Support)	11374-65	-1
3rd Intermediate Shaft Assembly (Gear Box)	11374-66	-2
2nd Intermediate Shaft Assembly (Gear Box)	11374-67	-2
Stabilizer Pivot Bracket (Stabilizing Leg)	11374-68	-1
Adjustment Screw (Stabilizing Leg)	11374-69	-1
Stabilizer Support Bracket (Stabilizing Leg)	11374-70	-1
Stabilizer Tubing Assembly (Stabilizing Leg)	11374-71	-1
Retaining Screw (Stabilizing Leg)	11374-72	-1
Point (Stabilizing Leg)	11374-73	-1
Pivot Bracket Stop (Stabilizing Leg)	11374-74	-1
Leveling Screw (Main Base)	11374-75	-1

LIST OF DRAWINGS AND SPECIFICATIONS (Continued)

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>N/A</u>
Reinforcing Bushing (Feed Pinion Shaft)	11374-76	-64
1st Intermediate Shaft Assembly (Gear Box)	11374-77	-2
Armature Shaft (motor)	11374-78	-20
Extractor Bushing Stop (Core Barrel)	11374-79	-126
Anchoring Nut (Main Base)	11374-80	-1
Percussion Bit Shank (Core Barrel)	11374-81	-126
Magnet Segment (Motor)	11374-82	-132
T-Screw (Stabilizing Leg)	11374-83	-1
Magnet Retainer Bracket (Motor)	11374-84	-132
Bit Extension Bearing (Drill String)	11374-85	-117
Bit Extension Tubing (Drill String)	11374-86	-117
Bit Extension Upper Insert (Drill String)	11374-87	-117
Bit Extension Lower Insert (Drill String)	11374-88	-117
Stabilizer Fixed Tubing (Stabilizing Leg)	11374-89	-71
Magnet Housing (Motor)	11374-90	-132
Insert (Stabilizing Leg)	11374-91	-71
Handle (Stabilizing Leg)	11374-92	-63
Tubing Insert (Stabilizing Leg)	11374-93	-63
Percussion Housing	11374-94	-2
Cover (Percussion Housing)	11374-95	-1
Cover Retainer Stud (Percussion Housing)	11374-96	-2
Drill Bit Spindle (Percussion Mechanism)	11374-97	-3
Cam Drive Bushing (Percussion Mechanism)	11374-98	-3
Spring Adjustment Nut (Percussion Mechanism)	11374-99	-3
Percussion Spring (Percussion Mechanism)	11374-100	-3

LIST OF DRAWINGS AND SPECIFICATIONS (Continued)

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>N/A</u>
Stationary Cam (Percussion Housing)	11374-101	-2
Moving Cam (Percussion Mechanism)	11374-102	-3
Upper Bearing Cap (Bevel Gear Housing)	11374-103	-2
Bevel Gear Nut (Gear Box)	11374-104	-2
Stabilizer Extension Tubing (Stabilizing Leg)	11374-105	-63
Slip Clutch Assembly (Vertical Drive)	11374-106	-2
Percussion Rod (Deleted)	11374-107	-3
Spacer (Percussion Mechanism)	11374-108	-3
Reinforcing Plate (Percussion Housing)	11374-109	-2
Bit Retainer Spring (Spindle Adapter to Drill String)	11374-110	-56
Drill Bit Spline (Spindle Adapter to Drill String)	11374-111	-56
Spindle Extension (Spindle Adapter to Drill String)	11374-112	-56
Drill Bit Extension Bushing (Spindle Adapter to Drill String)	11374-113	-56
Drill Bit End Cap (Spindle Adapter to Drill String)	11374-114	-56
Auxiliary Column Post (Vertical Stabilizing Column)	11374-115	-1
Rod Extension (Drill String)	11374-116	-1
Bit Extension Assembly (Drill String)	11374-117	-1
Seal Retainer (Percussion Mechanism)	11374-118	-3
Thrust Bearing Retainer (Percussion Housing Cover)	11374-119	-1
Bit Drive Bevel Gear (Bevel Gear Housing)	11374-120	-2
Main Column Post (Vertical Drive Column)	11374-121	-1
Auxiliary Support Column	11374-122	-1
Chuck Adapter (Anchor Hole Drill)	11374-123	-1
Upper Bearing (Core Barrel)	11374-124	-2
Collar (Percussion Mechanism)	11374-125	-3

LIST OF DRAWINGS AND SPECIFICATIONS (Continued)

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>N/A</u>
Percussion Bit Shank Assembly (Core Barrel)	11374-126	-1
Magnet Housing Spacer (Motor)	11374-127	-2
Motor End Cap (Motor)	11374-128	-2
Receptacle Housing (Motor)	11374-129	-2
Uncoupling Wrench (Auxiliary Tool)	11374-130	-1
Wrench Screw (Uncoupling Wrench)	11374-131	-1
Magnet Housing Assembly (Motor)	11374-132	-2
Percussion Bit Tip (Core Bit)	11374-133	-1
Core Extractor Bushing (Core Barrel)	11374-134	-1

ENGINEER'S SKETCH SHEET - FORM 2118

POST SPACER 11374-58
SW. BKT. 11374-5
SWITCH 11374-135

WING NUT
11374-7
(4)

COVER
11374-95

DRIVE ASSY
11374-2
SPINDLE ASSY
11374-3
BKT 11374-9
BKT 11374-10

COLUMN
11374-122

SPLINE ASSY
11374-56
ROD EXTENSION
11374-116 (6)
BIT EXTENSION
11374-117 (6)
BIT SHANK
11374-126
BIT TIP
11374-133
CORE BITTING
11374-134

CONTROL BOX 11374-4
BRACKET 11374-11

CLAMP 11374-12
STAB. EXT. 11374-63
PIVOT BKT. 11374-68
ADJ. SCR. 11374-69
SUPP. BKT 11374-70
TUBING 11374-71
RET. SCR. 11374-72
POINT 11374-73
STOP 11374-74
T-SCR. 11374-83 (2)

RACK 11374-60
PLATE 11374-61
COLUMN 11374-62

PIN ON ASSY

SW. BKT 11374-6
LEV. SCR. 11374-75 (3)
NUT 11374-80 (3)
POST 11374-115
POST 11374-121
BASE 11374-65
SWITCH 11374-135

MISC:-

UNCOUPLING WRENCH 11374-130
WRENCH SCREW 11374-131 (2)
CHUCK ADAPTOR 11374-123
CHUCK & KEY 11374-138
1/4" PERC. BIT 11374-162

BY R. KOEN DATE 6-14-65
APR. DATE

TITLE LUNAR CORE DRILL ASSY 11374-1

ENGINEER'S SKETCH SHEET - FORM 2118

SHAFT ASS'Y 11374-77
SPINDLE 11374-28
POST BRG 11374-54(2)

PLATE 11374-32
SHAFT 11374-77
LEVER 11374-16
SPRING 11374-15
ROLLER 11374-14

GEAR 11374-48
GEAR 11374-49
COLLAR 11374-55
BRG 11374-145
DOWEL 11374-142

COVER PLATE
11374-41

GEAR 11374-50
DOWEL 11374-161
(PIN FROM FRONT
ON ASS'Y TO SPINDLE
11374-28 - SLIP FIT)
(270 RPM) G

GEAR 11374-120
HOUSING 11374-29

PLATE 11374-103
BRG. RET. 11374-31

OTHER PARTS:-
BRG. 11374-136 (7)
BRG. 11374-143 (3)
BRG 11374-146
DOWEL 11374-141 (10)
BRG 11374-160

MAGNET HSG 11374-132
RECEPT. HSG 11374-129
END CAP 11374-128
BRUSH PLATE 11374-53
BRUSH 11374-25 (2)
CONNECTOR 11374-157
ARMATURE 11374-20
SPACER 11374-127

PLATE 11374-21
PLATE 11374-33

SHAFT ASS'Y 11374-67
SHAFT ASS'Y 11374-64
SHAFT ASS'Y 11374-66

PLATE 11374-23
PLATE 11374-24

PLATE 11374-22

PINION 11374-57
BRG 11374-147
CLUTCH 11374-106

STUD 11374-96(4)

HOUSING 11374-94

CAM 11374-101
BRG. 11374-124

BRG CAP 11374-103
BRG. 11374-144

BRG. RET. 11374-30
NUT 11374-104

SECTION A-A

SECTION B-B

GEAR TRAIN - ROTATION BIT (32:1)

DOWN FEED - A-B-C-D-E-F-G

UP FEED - A-B-H-E-F-G

GEAR TRAIN - VERTICAL FEED

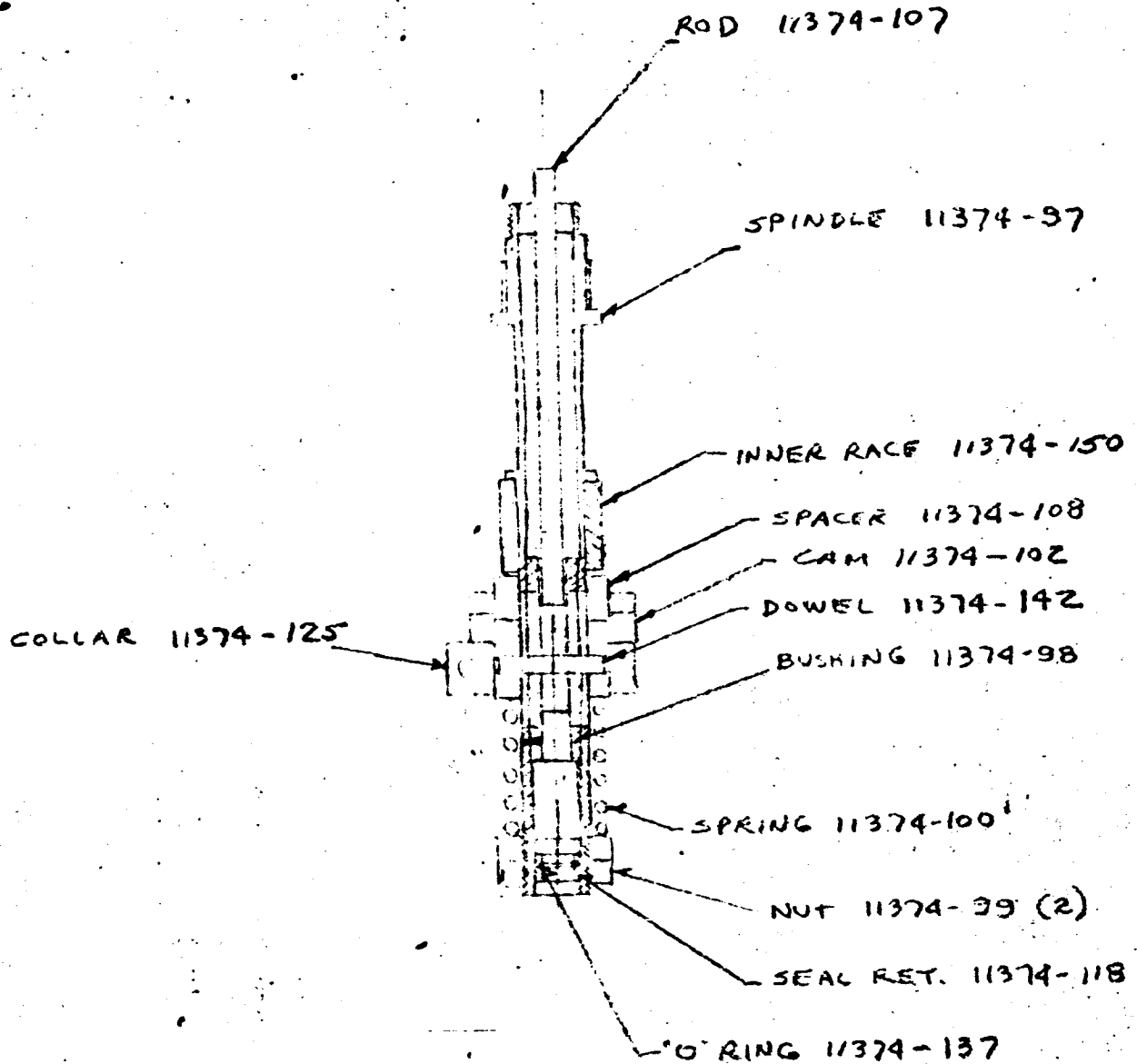
(519:1) A-B-I-J-K-L-M-N-O

BY R. KOEN DATE 6-14-65
APP. DATE

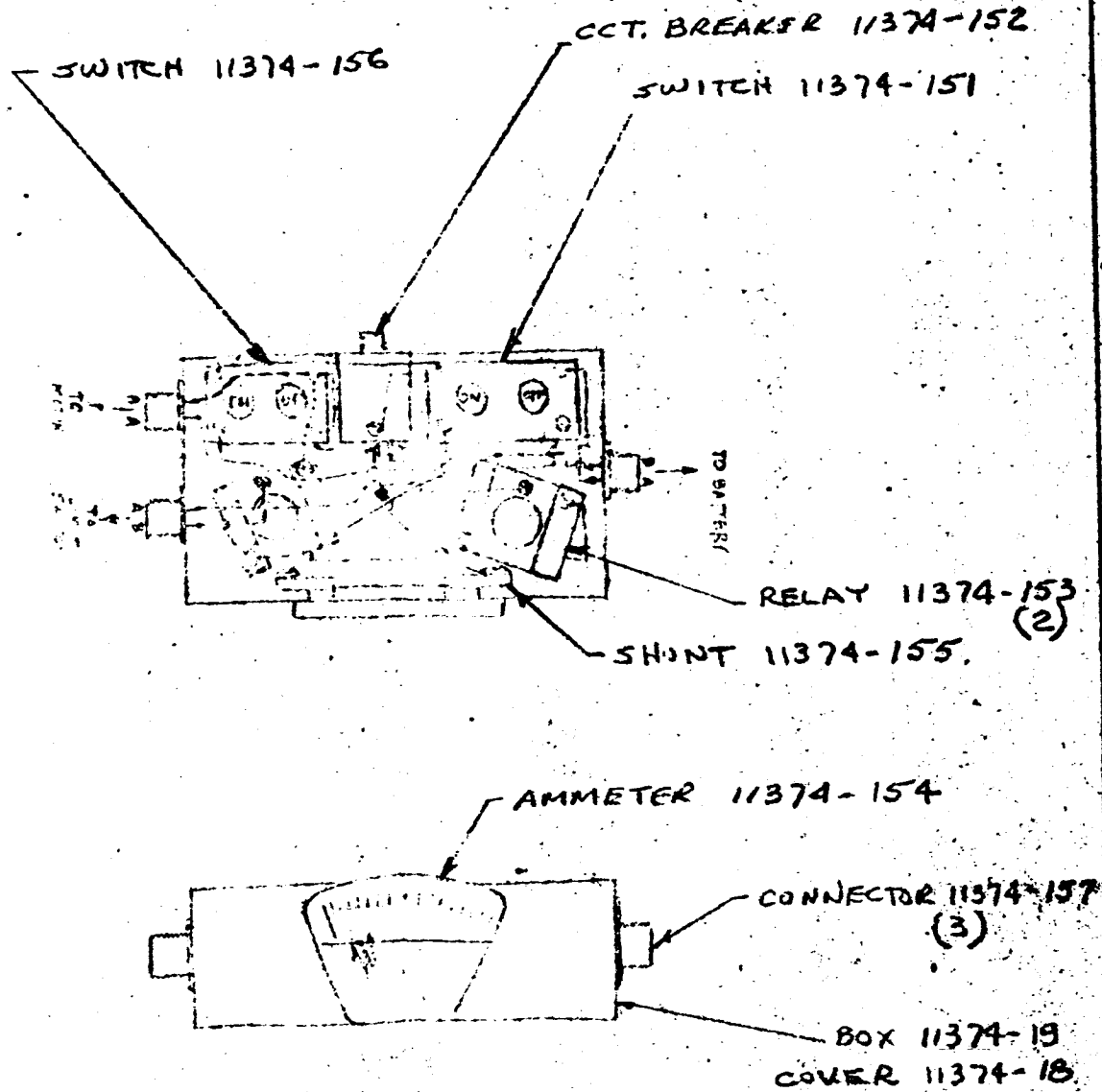
TITLE POWER DRIVE ASSEMBLY - NASA LUNAR
CORE DEVICE

11374-2

ENGINEER'S SKETCH SHEET - FORM 2118

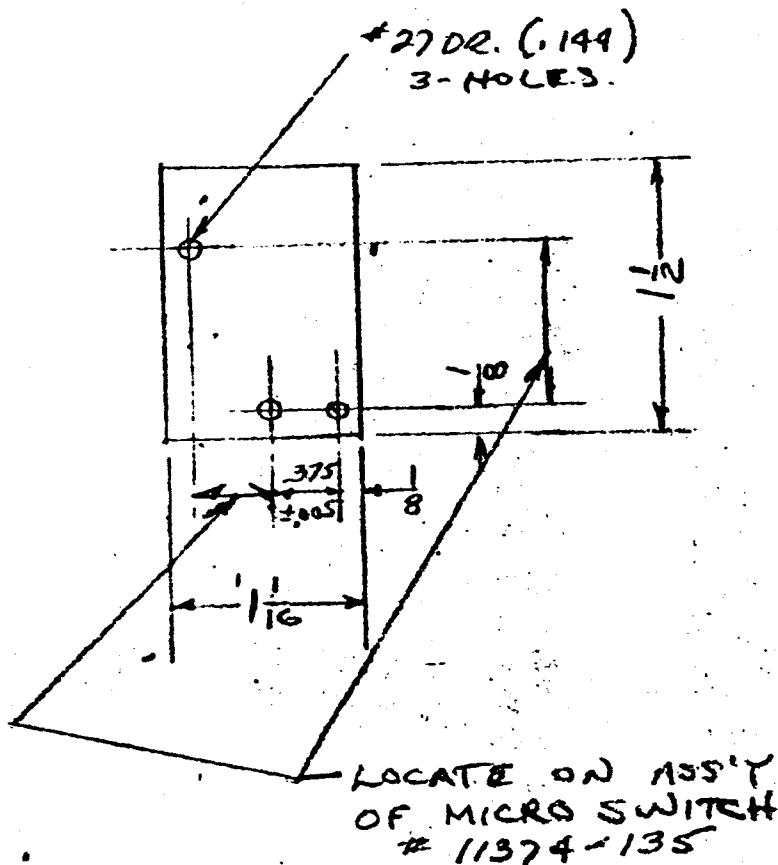


ENGINEER'S SKETCH SHEET - FORM 2118



MAT'L: $\frac{1}{16}$ STAINLESS STEEL.

ENGINEER'S SKETCH SHEET - FORM 2118



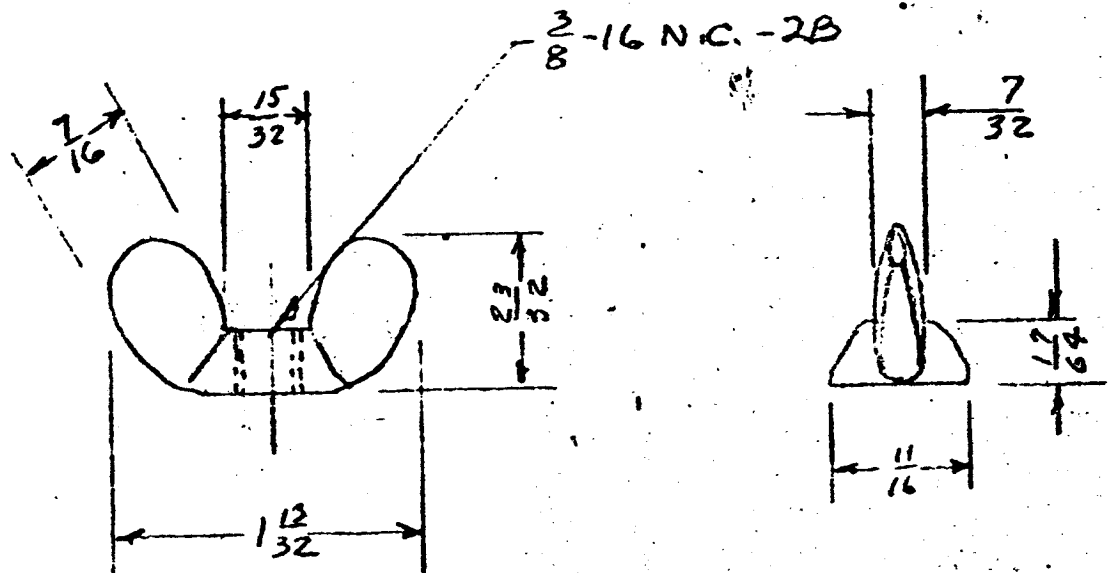
BY A.S.	DATE 22 JUN 65
APR	DATE

TITLE

SWITCH MTG. BKT. **11374-5**

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L - STEEL
FINISH - CADMIUM PLATE
MANUFACTURER - PARKER-KALON



BY A-S	DATE 14 SEP 65
APR	DATE

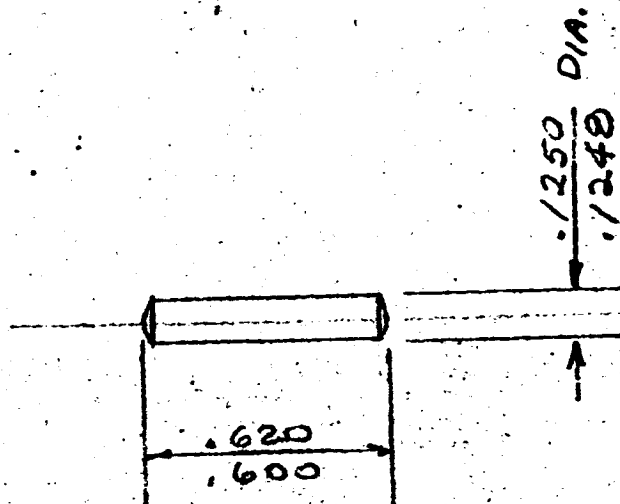
TITLE $\frac{3}{8}-16$ WING NUT

11374-7



ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L:- HIGH CARBON CHROME BEARING STEEL.
HARDNESS:- RC 60 MIN.
MANUFACTURER:- "TORRINGTON"

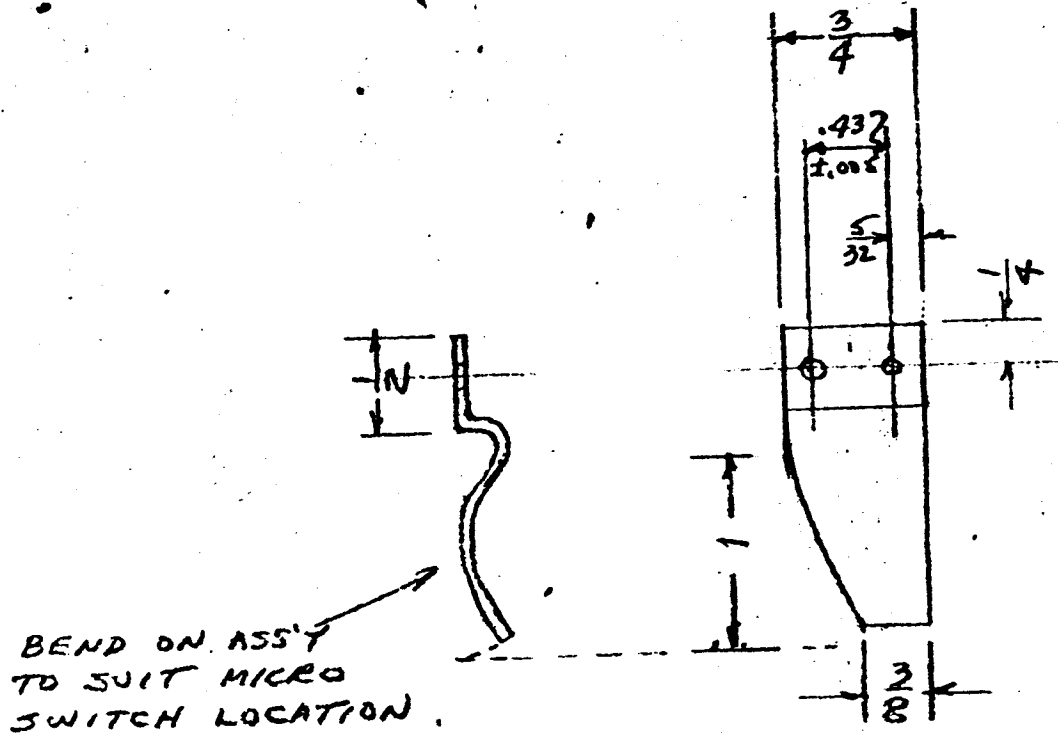


BY AS	DATE 16 JUN 63	TITLE
APR	DATE	

ROLLER 11374-8

ENGINEER'S SKETCH SHEET - FORM 2118

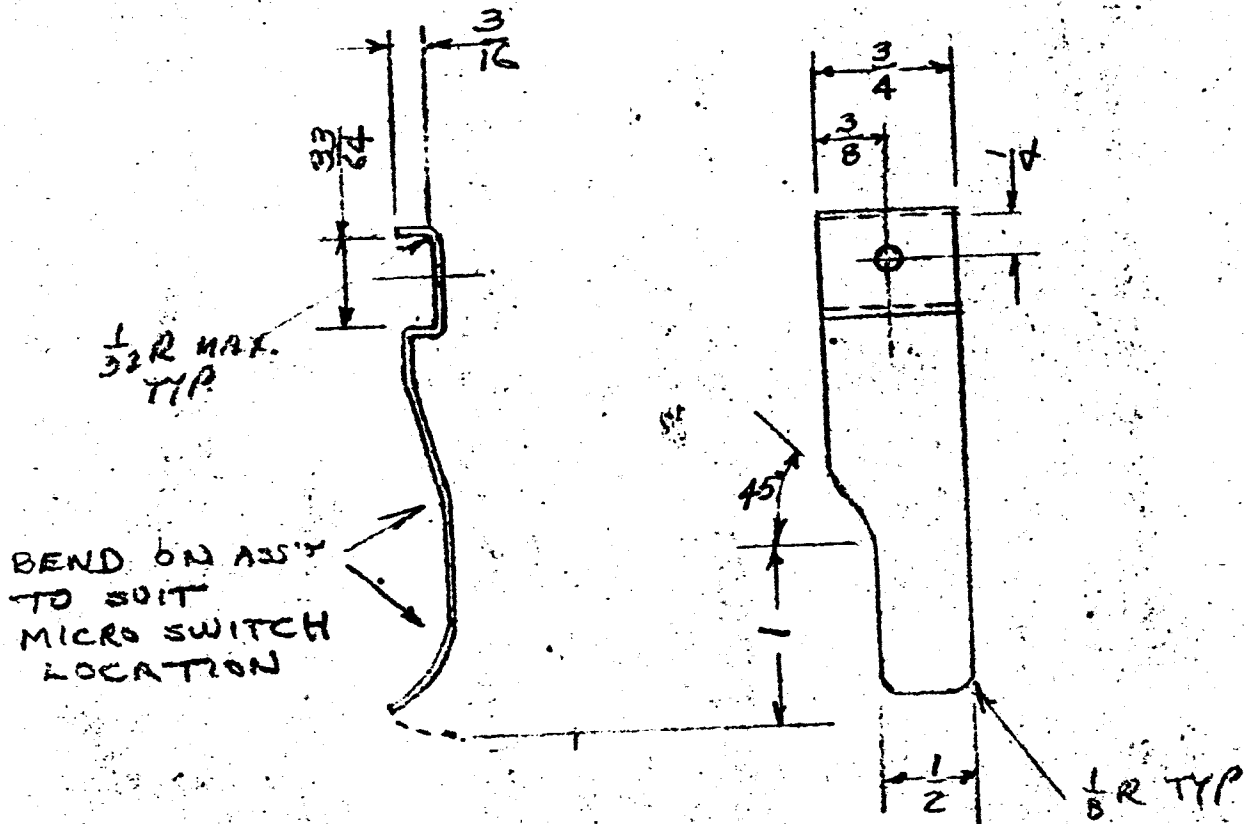
MAT'L: - $\frac{1}{32}$ STAINLESS STEEL.



LENGTH BEFORE BENDING:-
 $1 \frac{2}{8}$

MAT'L: $\frac{1}{32}$ STAINLESS STEEL.

ENGINEER'S SKETCH SHEET - FORM 2118



LENGTH BEFORE BENDING - $3\frac{1}{2}$ "

BY AS
APP.

DATE
DATE

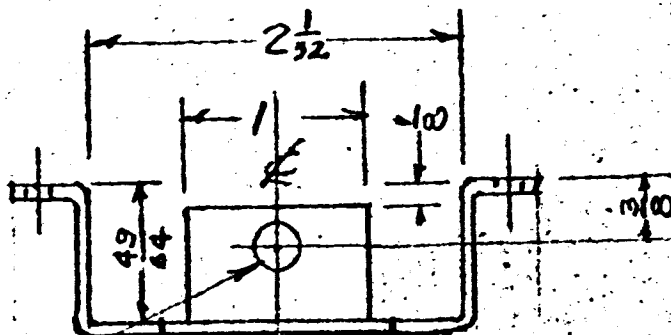
22 JUN 65
FILE

SWITCH CUT-OFF BKT

11374-10

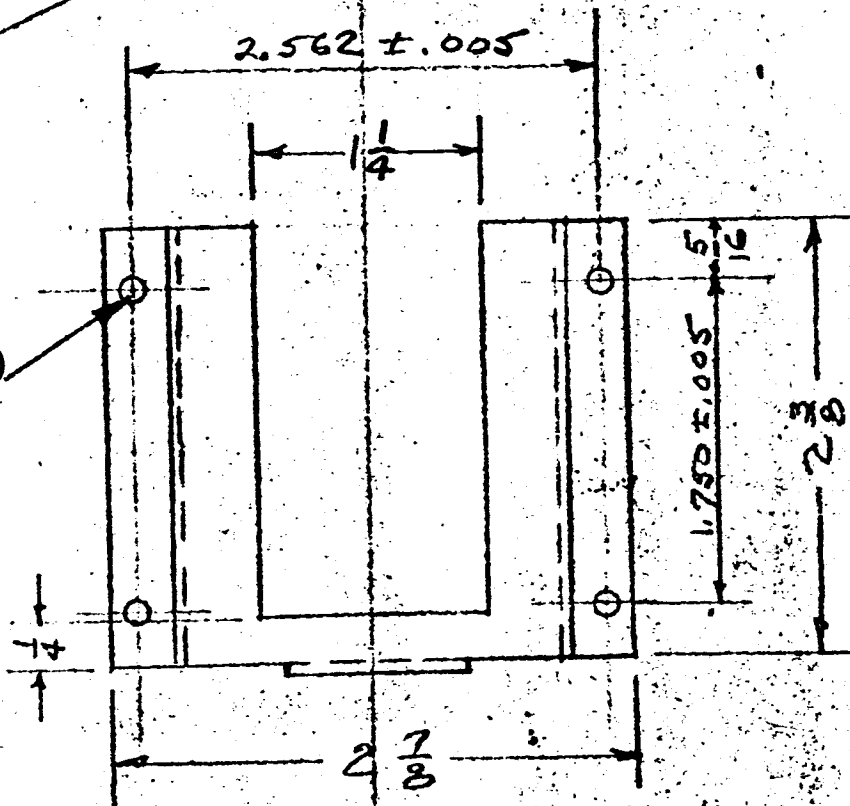
MAT'L - $\frac{1}{16}$ STAINLESS STEEL.

ENGINEER'S SKETCH SHEET - FORM 2118



17 DIA.
64
1-HOLE

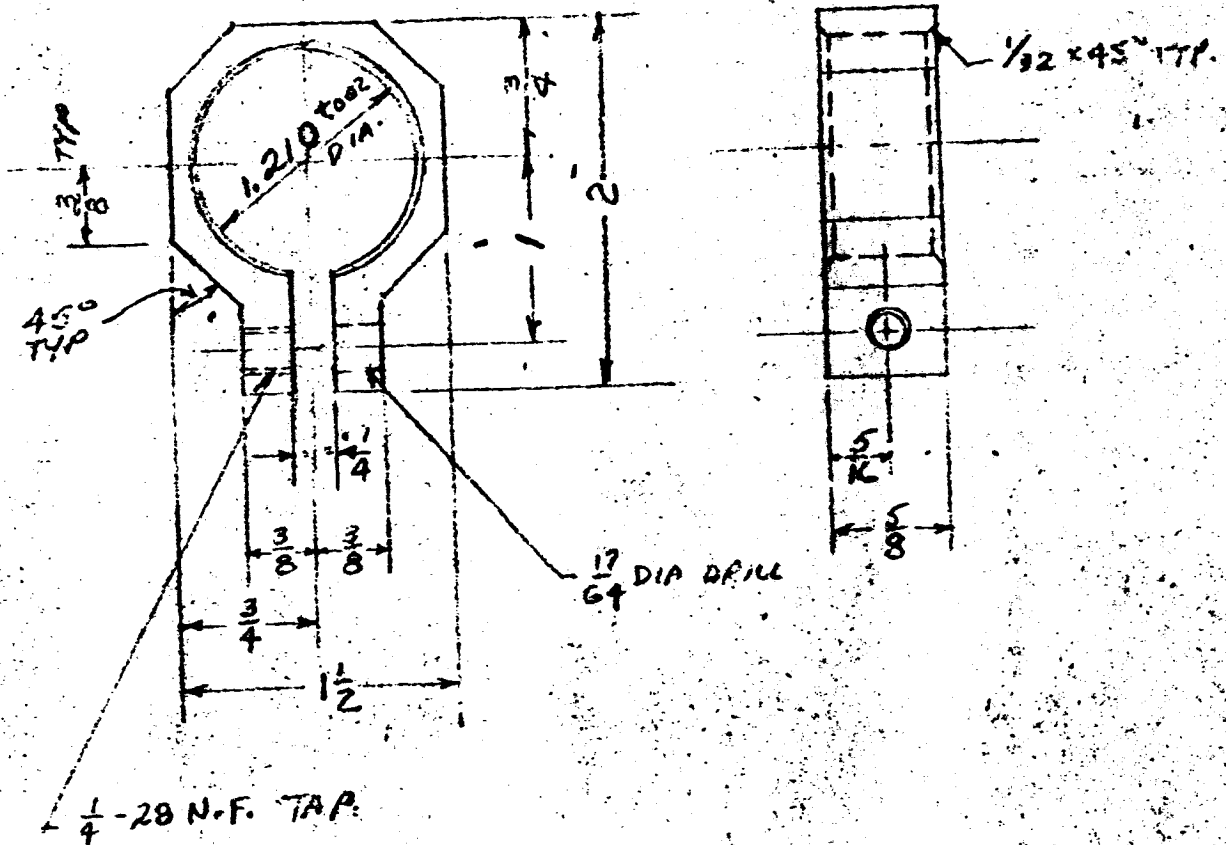
#27 DR. (.144)
4-HOLES



INSIDE BEND RAD. -
 $\frac{1}{32}$ MAX.

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: C.R.S.



BREAK ALL SHARP EDGES.

NO. REQ'D

PATTERN NO.

PIN

NO. 11374-13

MATERIAL:

MFR.

AFBMA NO.

MFRS. NO

MATERIAL

① TORRINGTON

HIGH CARBON
CHROME BR'G STL

Q-8292

② KAYDON ENG. CORP

HIGH CARBON
CHROME BR'G STL

0938L500

A-474

③ STD HARDNESS R/A 81.2-83.4

.0938" DIA.
-.0002"

.500"
-.020"

SPHERICAL ENDS



DATE OF ENGINEERING CHANGES

DATE

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

SCALE: 2/1

5-10-61

DRAWN BY	T28
TRACED BY	
CHECKED BY	

FRACTIONAL DIMENSION TOL. $\pm .008$
BREAK ALL SHARP EDGES & BURR

CHECKED BY AUDIT GROUP:

FORM 210 2000 12-60
SPEIDEL & CO., INC. NO. 1574

USE ON TYPE

THE BLACK AND DECKER MFG. CO., TOWSON, MD.

NO. 11374-15

NO. REQ'D PATTERN NO. COMPRESSION SPRING

MATERIAL:--- .020" DIA. MUSIC WIRE ASTM A228

SUPPLIER TO APPLY RUST INHIBITOR

O.D. - .120" ± .003"

FREE LENGTH - 3/8" ± 1/64"

NO. COILS - 8 TOTAL - 6 ACTIVE + 1 CLOSED ON EACH END

HAND - OPTIONAL

APPROX. LOAD - 5# @ 1/4" LONG

DATE OF ENGINEERING CHANGES

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

FRACTIONAL DIMENSION TOL. - .000"
BREAK ALL SHARP EDGES & BURRS

DRAWN BY	
TRACED BY	
CHECKED BY	DMC

11-1-61

CHECKED BY AUDIT GROUP
ADD 1 9 1067

USE ON TYPE

THE BLACK AND DECKER MFG. CO., TOWSON, MD.

FORM 210 2000 12-60
EIDEL & CO., INC. NO. 1074

NO. 11374-16

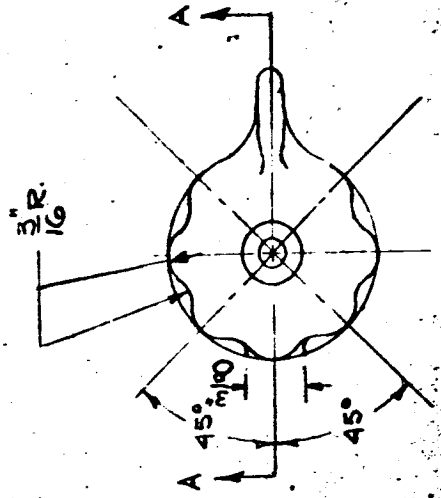
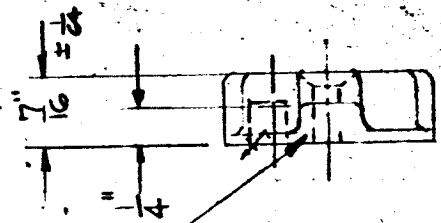
SHIFT LEVER

PATTERN NO. B&D # 4414

MATERIAL: SAND CAST ALUM. A.S.T.M. B2G CS72A BRUSH FINISH

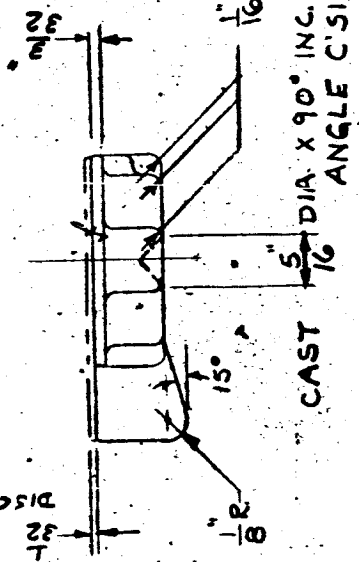
10051679

GATE LUG

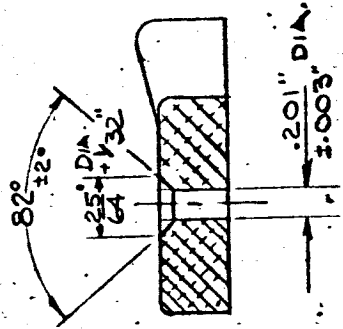


ELONGATED HOLE
DEPTH: 1/4"

DISC SAND
1/32" FOR



CAST 5/16 DIA X 90° INC.
ANGLE C'SINK



SECTION A-A

3-3-62

DRAWN BY	WME
TRACED BY	
CHECKED BY	DME

FRACTIONAL DIMENSION TOL. ± .008"
BREAK ALL SHARP EDGES & BURR

FULL-SCALE

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

DATE OF ENGINEERING CHANGES

USE ON TYPE

CHECKED BY AUDIT GROUP: [Signature]
FORM 3088 1000 8-61
PEIDEL & CO., INC. NO. 1074

THE BLACK AND DECKER MFG. CO., TOWSON, MD.

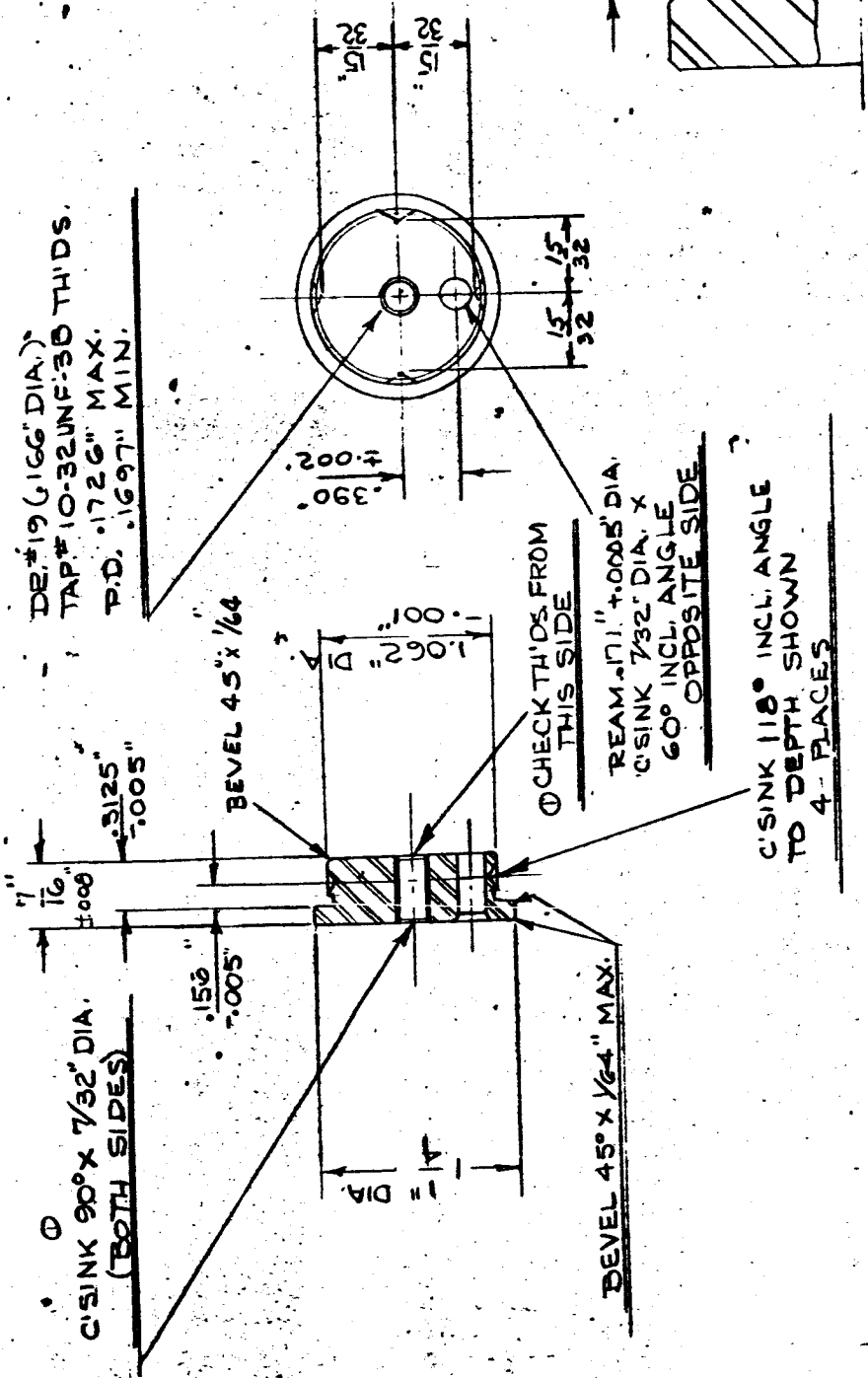
NO. 113 74-17

ECCENTRIC SHAFT

NO. REQ'D PATTERN NO.

MATERIAL: 1 1/4" DIA. C1215 ST'L (2234#)

61150125



ENLARGED VIEW OF UNDERCUT

FRACTIONAL DIMENSION TOL. $\pm .008$ "
BREAK ALL SHARP EDGES & BURR

FULL SCALE

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

DRAWN BY	WJD
TRACED BY	
CHECKED BY	DME

FORM 2088 1000 6-81
SPEIDEL & CO., INC. NO. 15P4

CHECKED BY AUDIT GROUP:
APR 19 1967 RWE

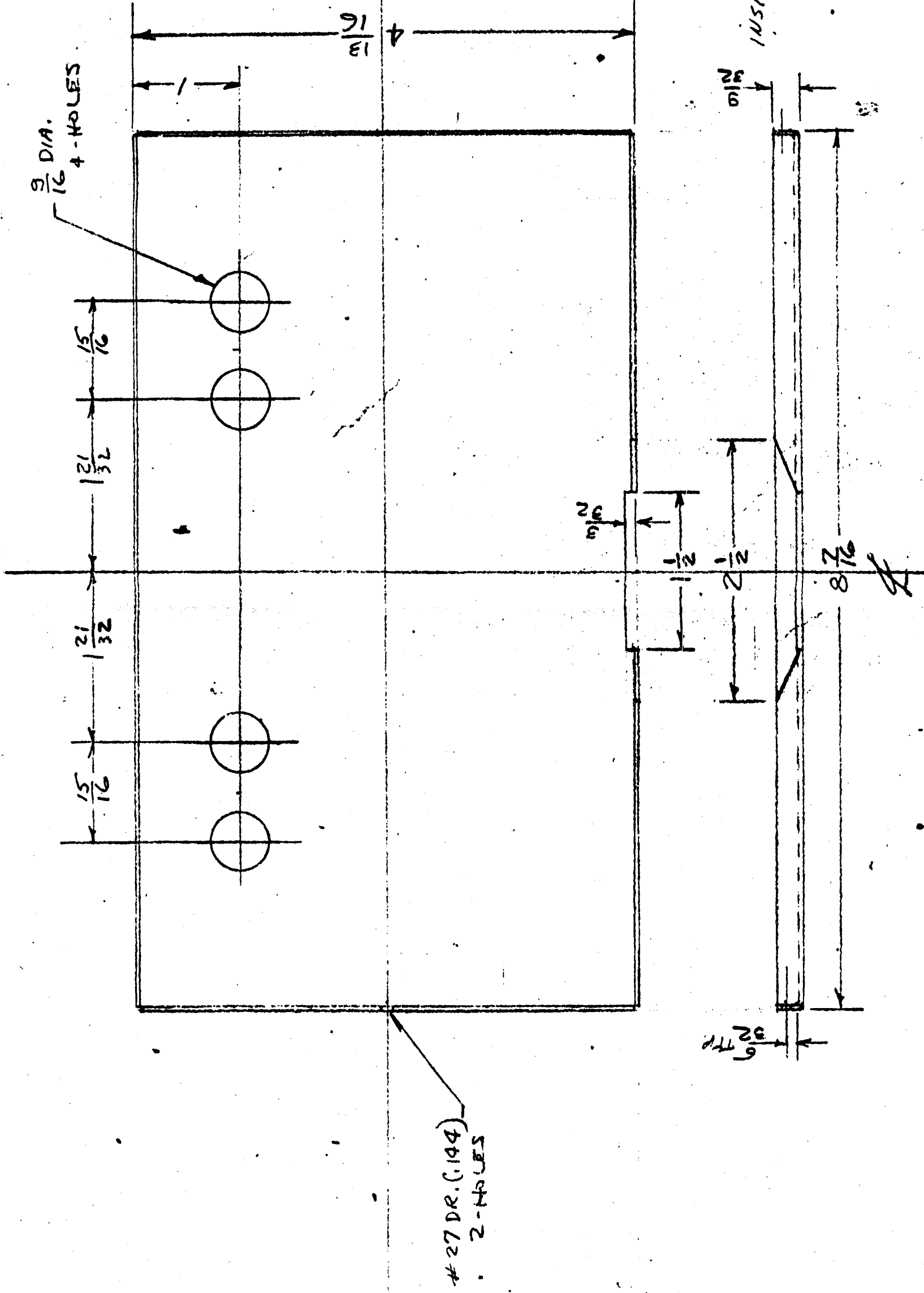
DATE OF ENGINEERING CHANGES

SEE ON TYPE

CONTROL BOX COVER

11374-18

MAT'L: $\frac{1}{32}$ STAINLESS STEEL.



THE BLACK & DECKER MFG. CO., TOWSON, MD.

AS. 18 JUN 65

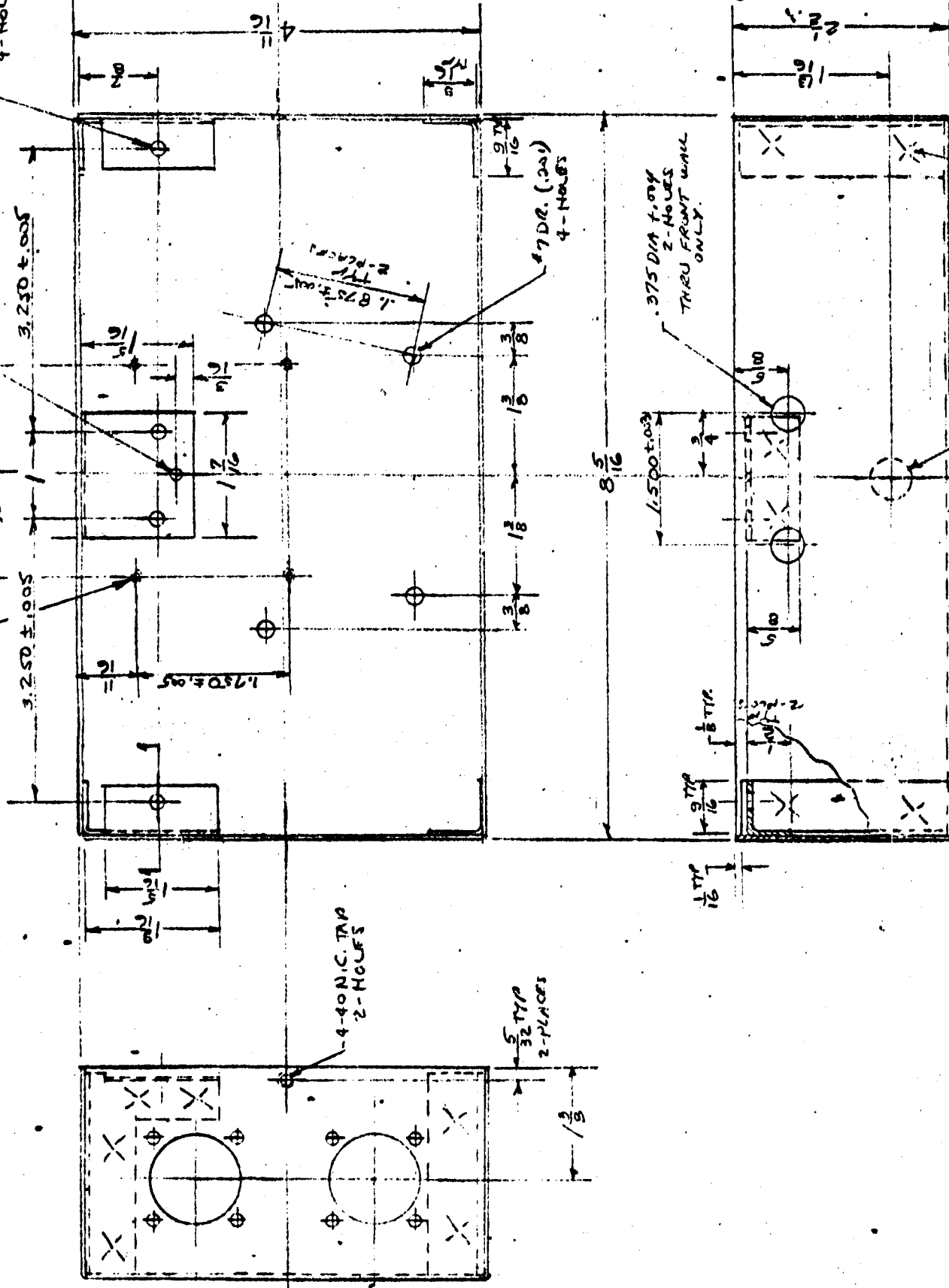
UNINAR NASA

11374-19

4-40 N.C. 1710
4-Hours.

27 DE. (44)
1-14-68

#2202 (144) } 4th 3 Hole
PATTENSON
14 DIA



MAX. INSIDE OF RD
RADIUS :- $\frac{1}{32}$

SPOT
WFLD

31 DIA.
64
1-HOLE
THRU REAR
WALL.

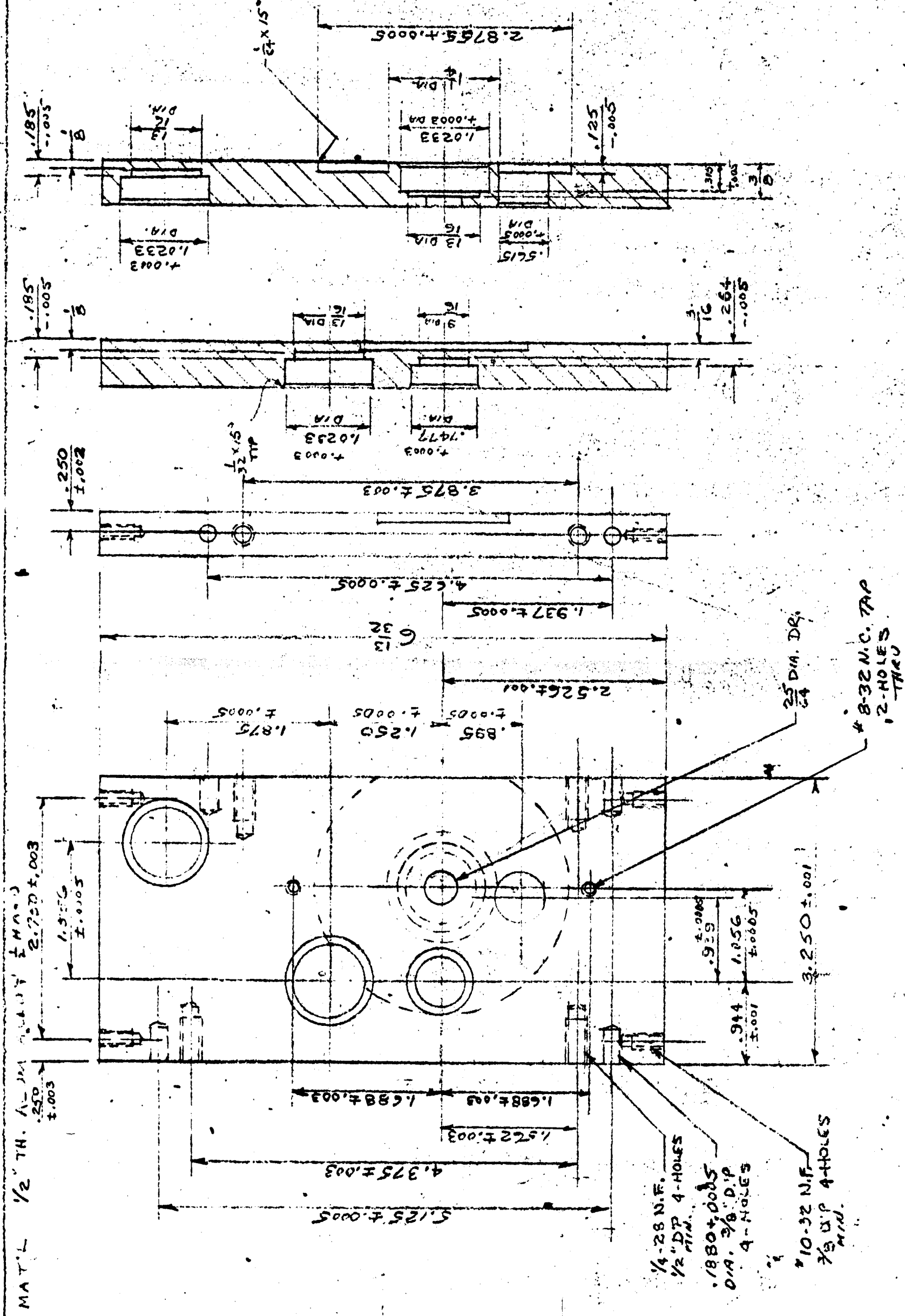
LUNAR NASA

5. 10 June 55

THE BLACK & DECKER MFG. CO., TOWSON, MD.

REAR PLATE

11374-21



THE BLANK & DECKER MFG. CO., TOMSON, MD.

LUNAR NASA

11374.22

[illegible]

LUNAR NASAS

MS 27 JAN 1954

THE BLACK & DECKER MFG. CO., TOWSON, MD.

BOTTOM PLATE

11374-23

MAT'L 1/2 TH. ALUM. ALLOY 1/2 HARD
1/2 x 45°
BOTH S.

4.531 ± .0005

1870-.0005 DIA
4 HOLES

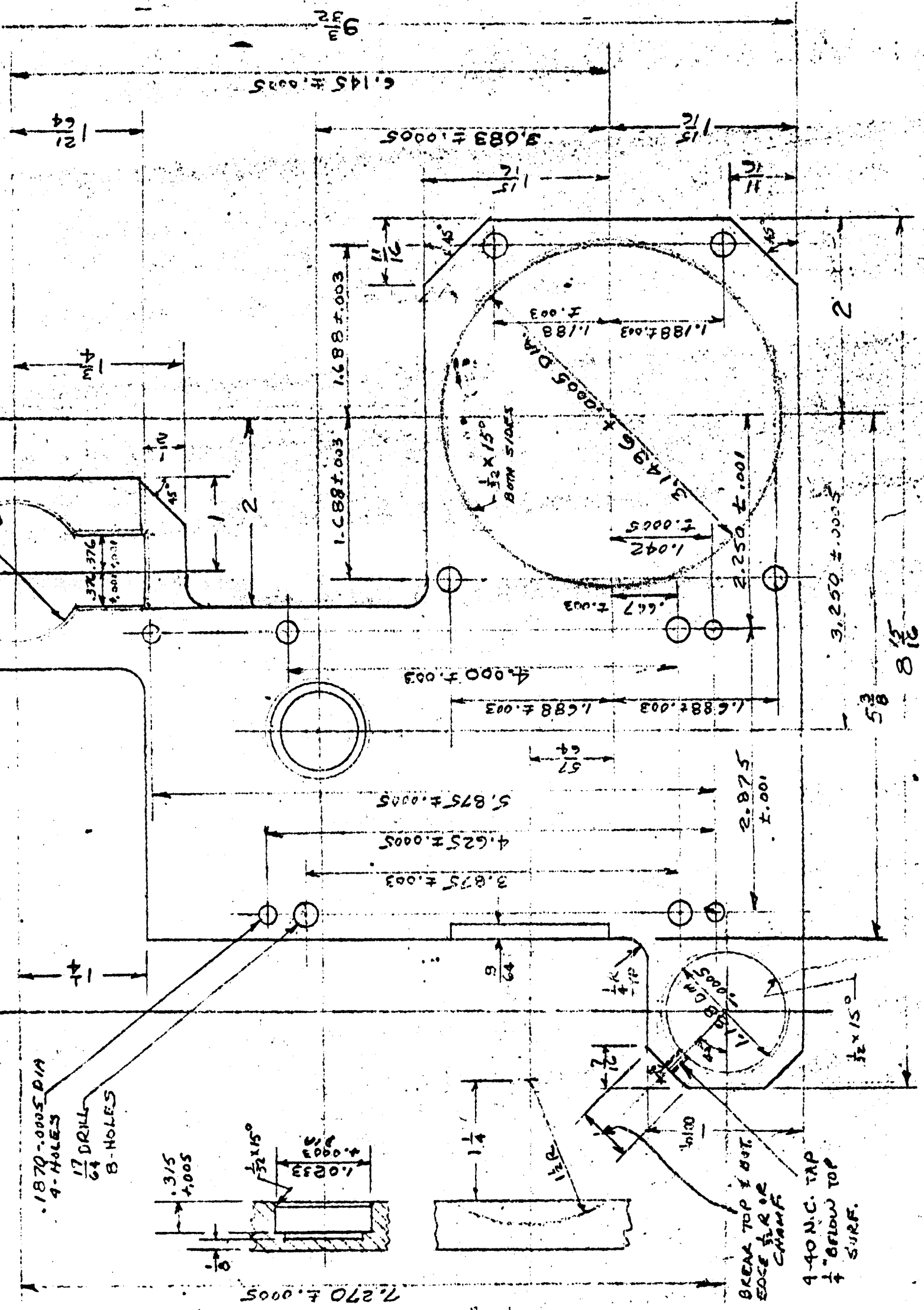
17/64 DRILL
64 B-HOLES

3/5
4.005

1/2 x 15°
4.003

7.270 ± .0005

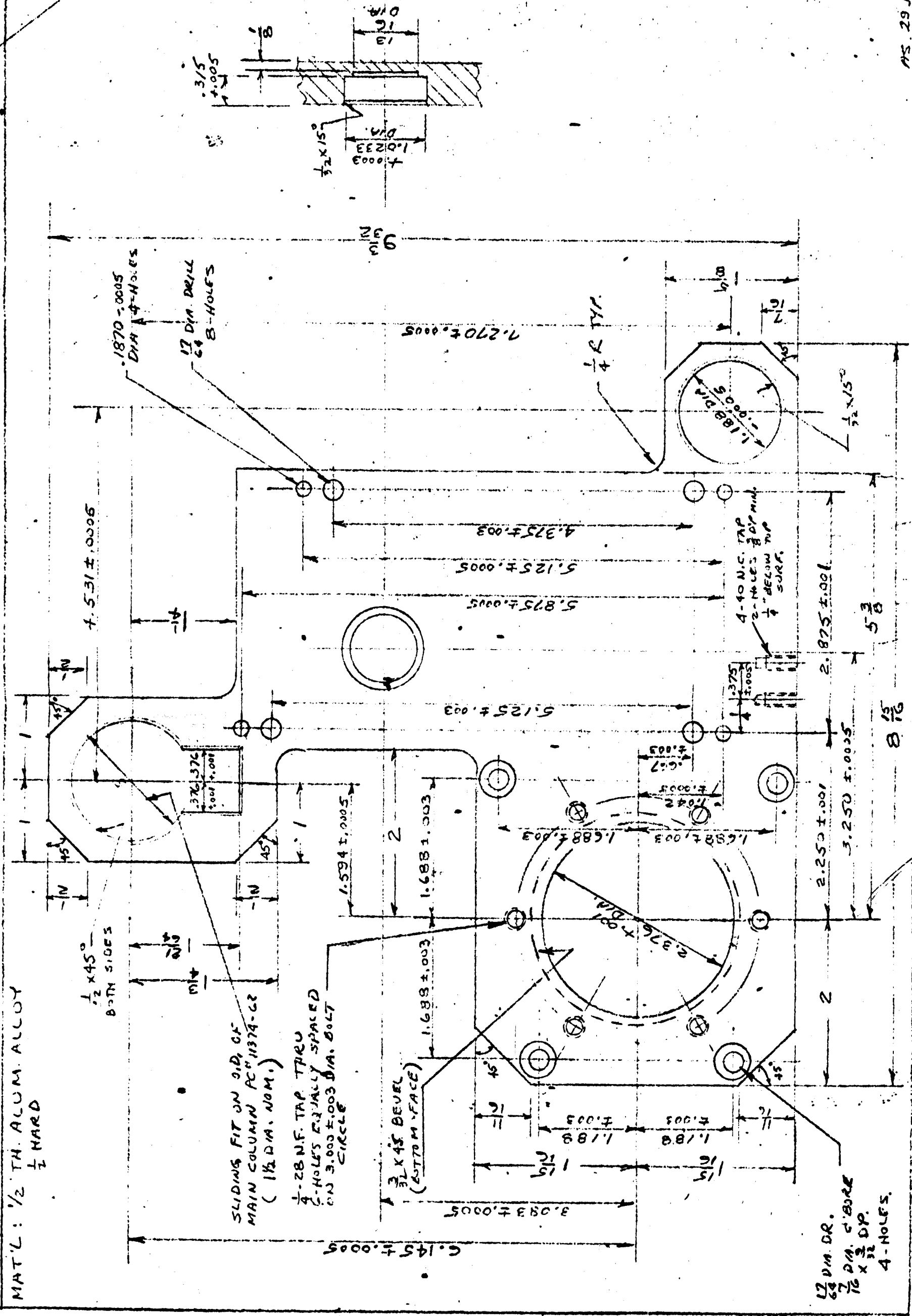
SLIDING FIT ON O.D. OF MAIN
COLUMN PC# 11374-62
(1 1/2 DIA. NOMINAL)



LUNAR NASA

AS 28 JAN/65

THE BLADE & DECKER MFG. CO., TOWSON, MD.



LUNA 2

NO. 11374-26

NO. REQ'D	PATTERN NO.

PATTERN NO.

MATERIAL:--- 8620H STEEL

! NORMALIZED

ANNEAL

CARBURIZE

CYANIDE . 006 - . 010

COOL IN

HEAT AT

QUENCH IN OIL

REHEAT A

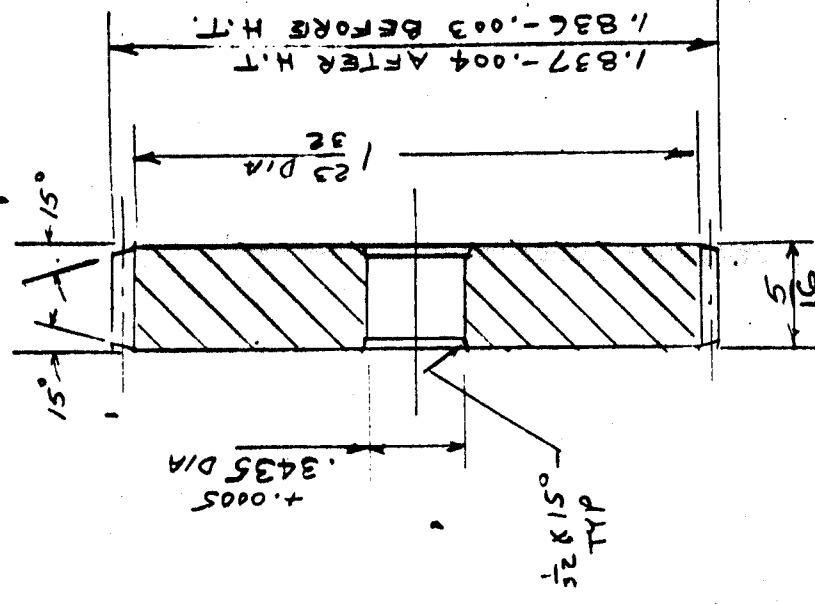
QUENCH IN

DRAW AT 350°F MIN

ROCKWELL 15N 89 MIN

MET. APPVD.

NOTE



GEAR DATA	BEFORE HEAT TREAT		AFTER HEAT TREAT	
	PINION	GEAR	PINION	GEAR
NUMBER OF TEETH		65		65
NORMAL DIAMETRAL PITCH		36		36
NORMAL PRESSURE ANGLE		20°		20°
HELIX ANGLE	H.	0° H.	H.	0° H.
STANDARD PITCH DIAMETER		1.8056		1.8056
TOOTH FORM		SHORT ADD.		SHORT ADD.
CALC. TOOTH THICKNESS ON STD. PITCH CIRCLE		.0342		.0349
AGMA QUALITY CLASS		9		8
MASTER GEAR BASIC CIRCULAR TOOTH THICKNESS		.0436		.0436
MASTER GEAR NUMBER OF TEETH		80		80
TESTING PRESSURE IN OUNCES		24		24
MAXIMUM TOTAL COMPOSITE ERROR		.0019		.0019
MAXIMUM TOOTH TO TOOTH COMPOSITE ERROR		.0070		.0010
TESTING RADIUS & TOLERANCE		.8895-.0010		.8905-.0020
MEASUREMENT OVER TWO .054 DIAMETER PINS (REF.)		1.8708		1.8727
LEAD		—		—
LEAD ERROR		.0003		.0006

HOBBLING DATA			
	SINGLE	THREAD HOB	THREAD HOB
INDEX GEARS			
ACTUAL FEED			
FEED GEARS			
HOB HAND			
GEAR SHAPER DATA			
GUIDE LEAD			
CUTTER TEETH			

TOOTH PROFILE		
PINION		GEAR
BASE RADIUS		BASE RADIUS
54		54
48		48
42		42
36		36
30		30
24		24
18		18
12		12
6		6
.0002"		.0002"

DATE:	
DATE:	
DATE:	

DATE

FRACTIONAL DIMENSION TOL. $\pm .008$

BREAK ALL SHARP EDGES & BURR

1 Feb 69

DRAWN BY	TRACED BY	CHECKED

FORM 4048 500 7-62
SPEIDEL & CO., INC. NO. 1074

LUNAR NASA

USE ON TYPE

11374-28

SPINDLE

MATERIAL: STD 180 STK

SLIP FIT IN
MATING SPLINE
PC # 11374-48
GEAR TOWARD
SHOULDER.

.092-.001
8-KEYS

$\frac{1}{32} \times 15^\circ$

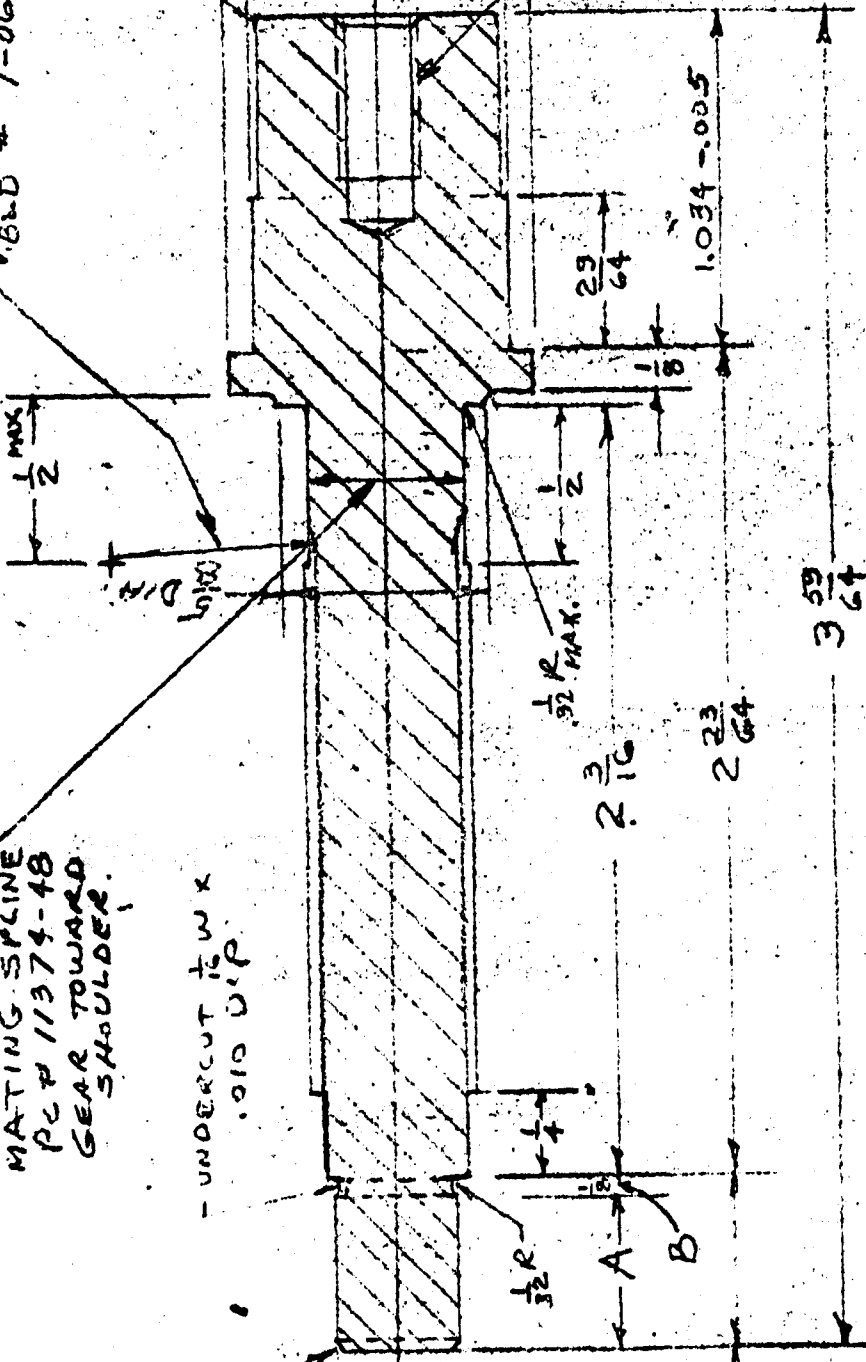
- UNDERCUT $\frac{1}{16} \times$
.010 D.P.

RADIUS OF CUTTER
".625 # 1-06-635
 $\frac{1}{32} \times 15^\circ$

1.500 DIA.
-.0005
1.7873 DIA.
-.0008
1.5 DIA.

INDUCTION
HARDEN
HEAT AT 1550°F
OIL QUENCH
TEMPER AT 70°F
MIN.

1 HR.
HARDNESS AREA A: RC 50-55
AREA B: BLUE TEMPER COLOR
LIMITED TO 1/4" LENGTH
CORE HARDNESS AREA "A" RC 45 MAX.



THE BLACK & DECKER MFG. CO., TOWSON, MD.

AS 2 FEB 65

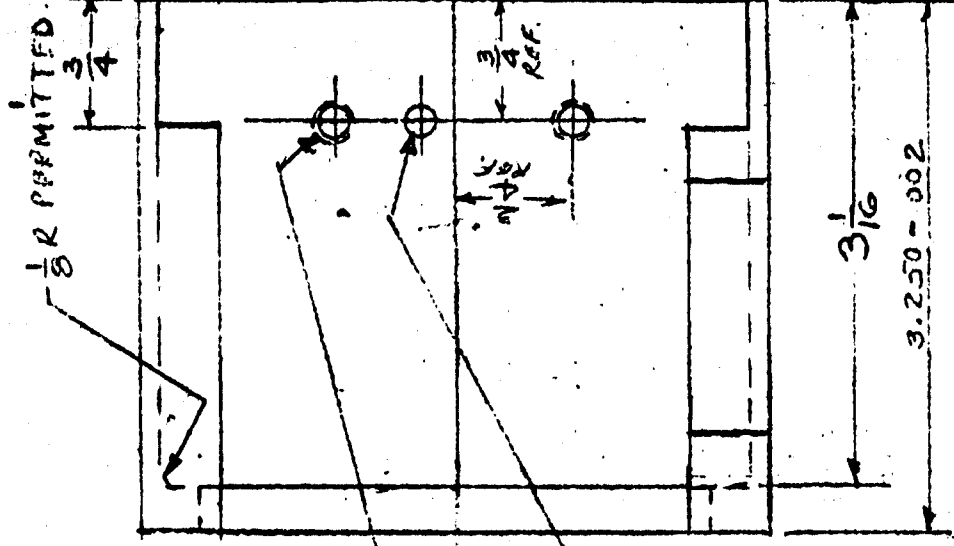
LONAK NASA

BEVEL GEAR HOUSING

11374-29

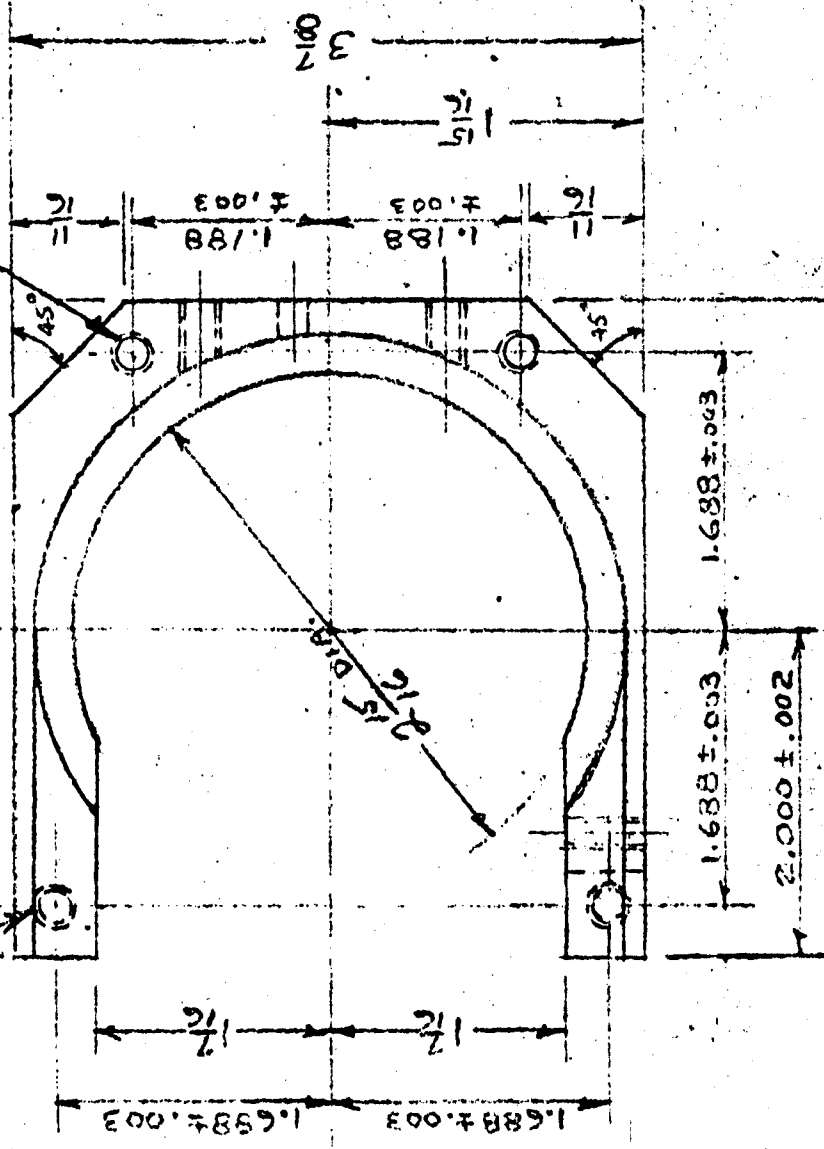
MAT'L: ALUM. ALLOY $\frac{1}{2}$ HARD

TAP
 $\frac{1}{4}$ -20 N.C. X $\frac{1}{2}$ D.P.M.N.
 2-HOLES
 (ON OPPOSITE SURF.)

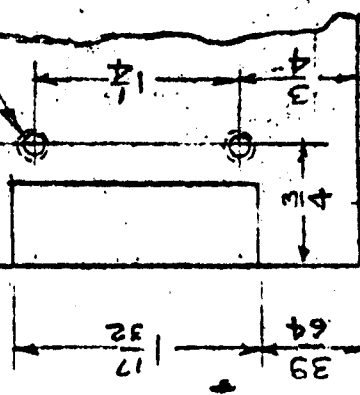


$\frac{1}{4}$ -28 N.F. TAP
 2-HOLES THRU
 ON ASS'Y OF
 REINFORCING
 PLATE PC# 11374-109

.188 ± .001 DIA.
 ON ASS'Y OF
 PC# 11374-109



TAP
 $\frac{1}{4}$ -20 N.C. X $\frac{1}{2}$ D.P.M.N.
 4-HOLES
 (2-ON OPP SURF.)



AS. 374/65

LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

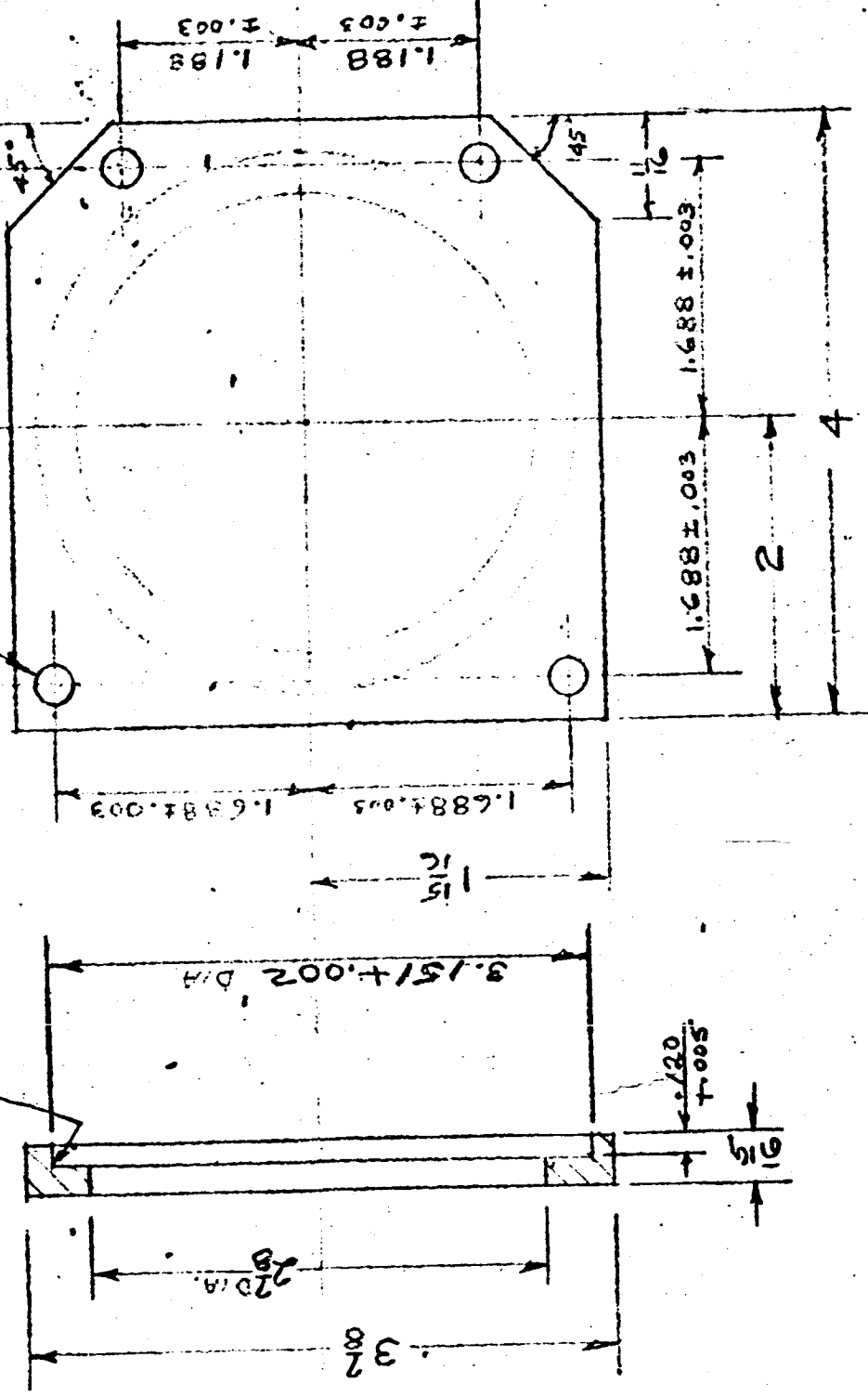
BEARING RETAINER

11374-30

MAT'L: ALUM ALLOY, 1/2 HARD

17/64 DIA. THRU
4 HOLES

1/32 R MAX.



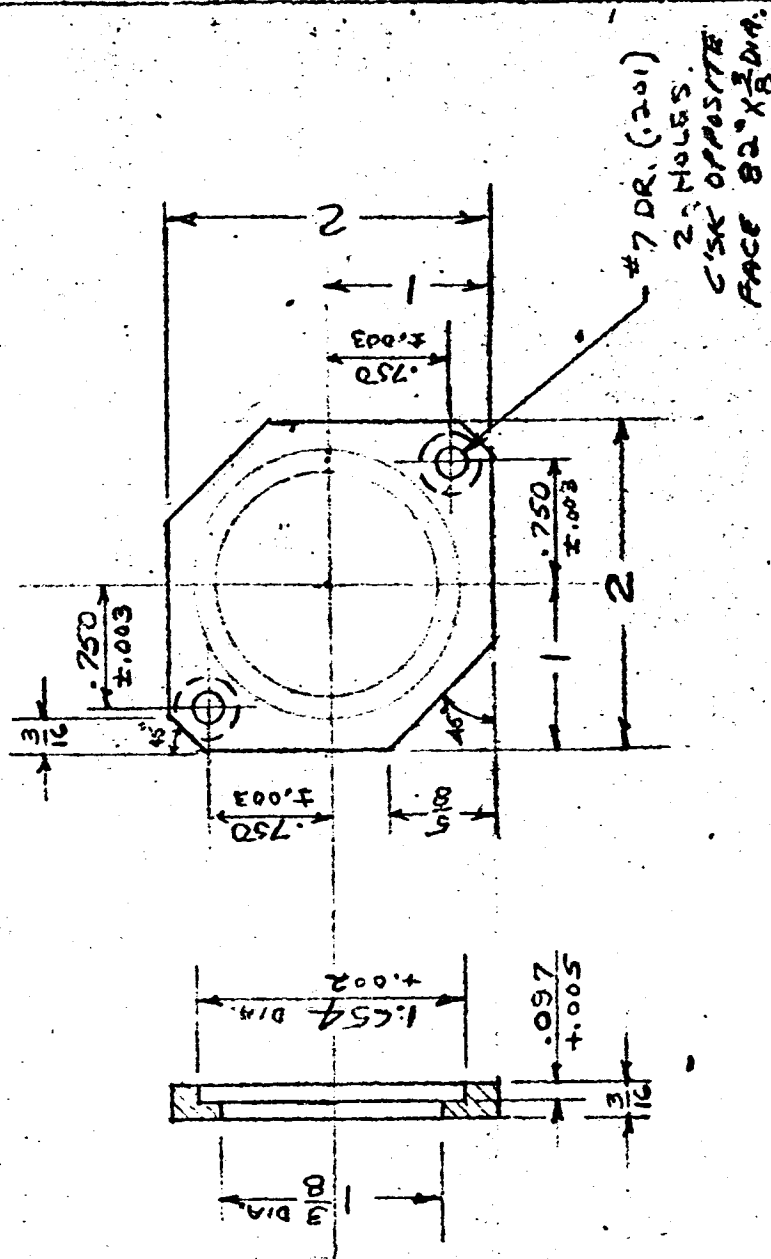
AS. 3906/CS

LUNAR NASA

THE BLICK & DECKER MFG. CO., TOWSON, MD

11374-31

MAT'L: ALUM. ALLOY $\frac{1}{2}$ HARD



THE BLACK & DECKER MFG. CO., TOWSON, MD.

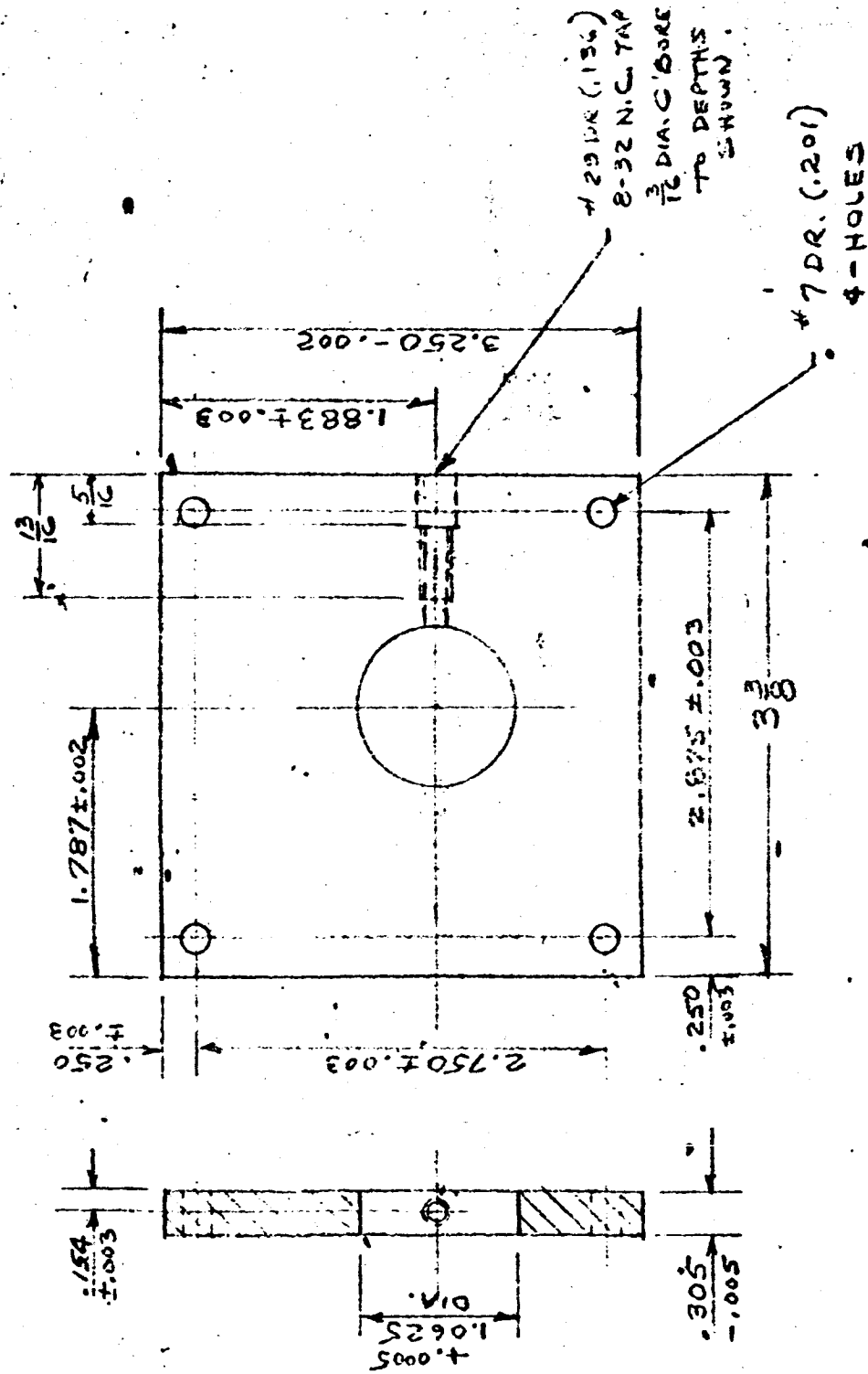
AS 3 Feb 65

A
A
A
A
A
A

SHIFTER PLATE

11374-32

MAT'L: ALUM ALLOY 1/2 HARD



THE DECK & DECKER MFG. CO., TOLSON, MD.

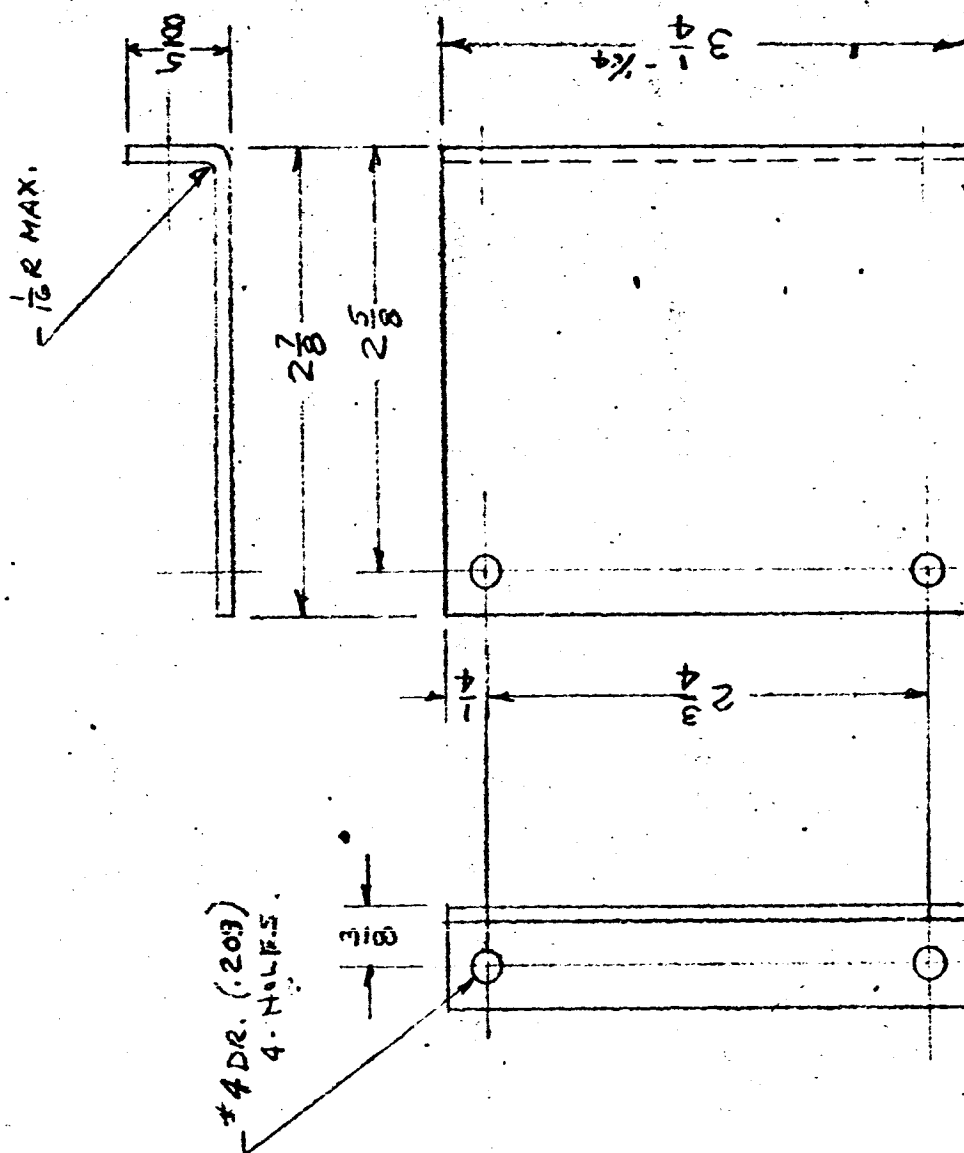
AS. 3 Feb/65

LUNAR NASA

END PLATE

11374-33

MAT'L: 1/16 TH. C.R.S. FINISH: PENETRATE.



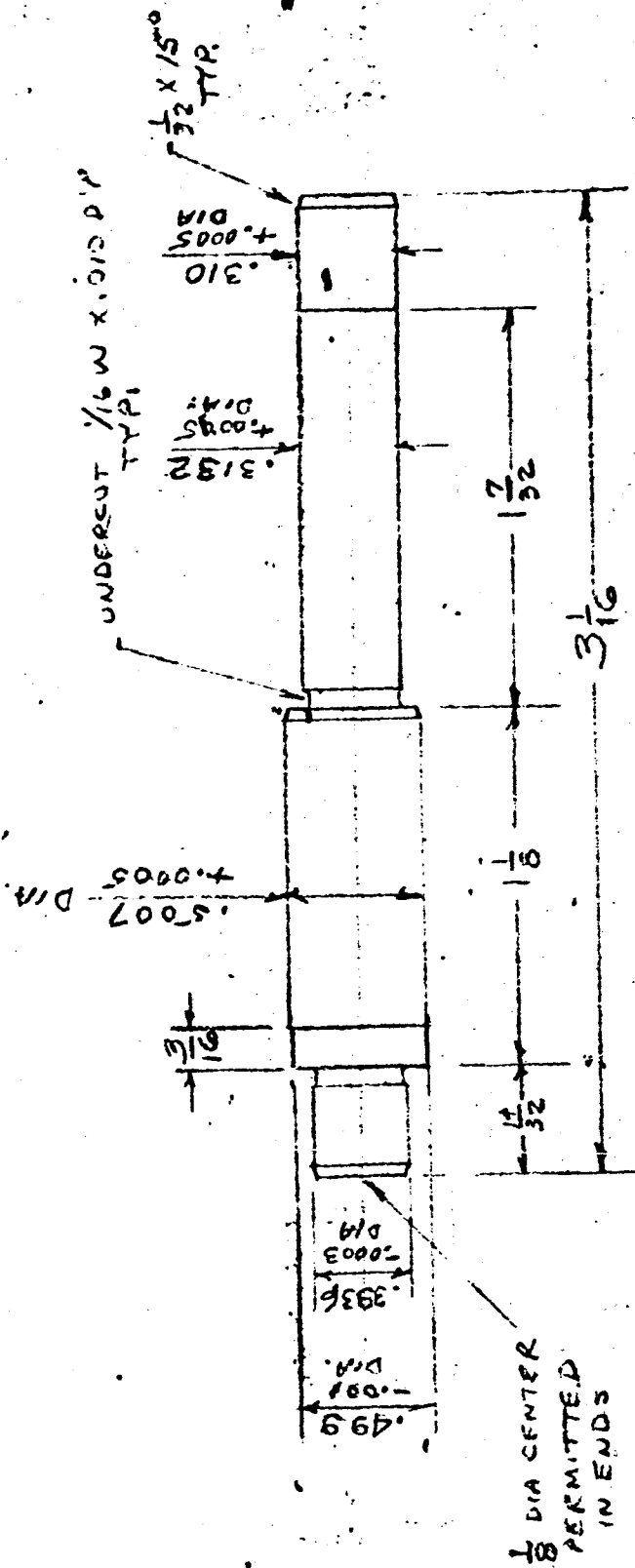
THE BLACK & DECKER MFG. CO. THOMSON, MD.

A.S. 4 Feb 65

LUNAR NASA

11374-34

MAT'L:- C-1144 ST'L



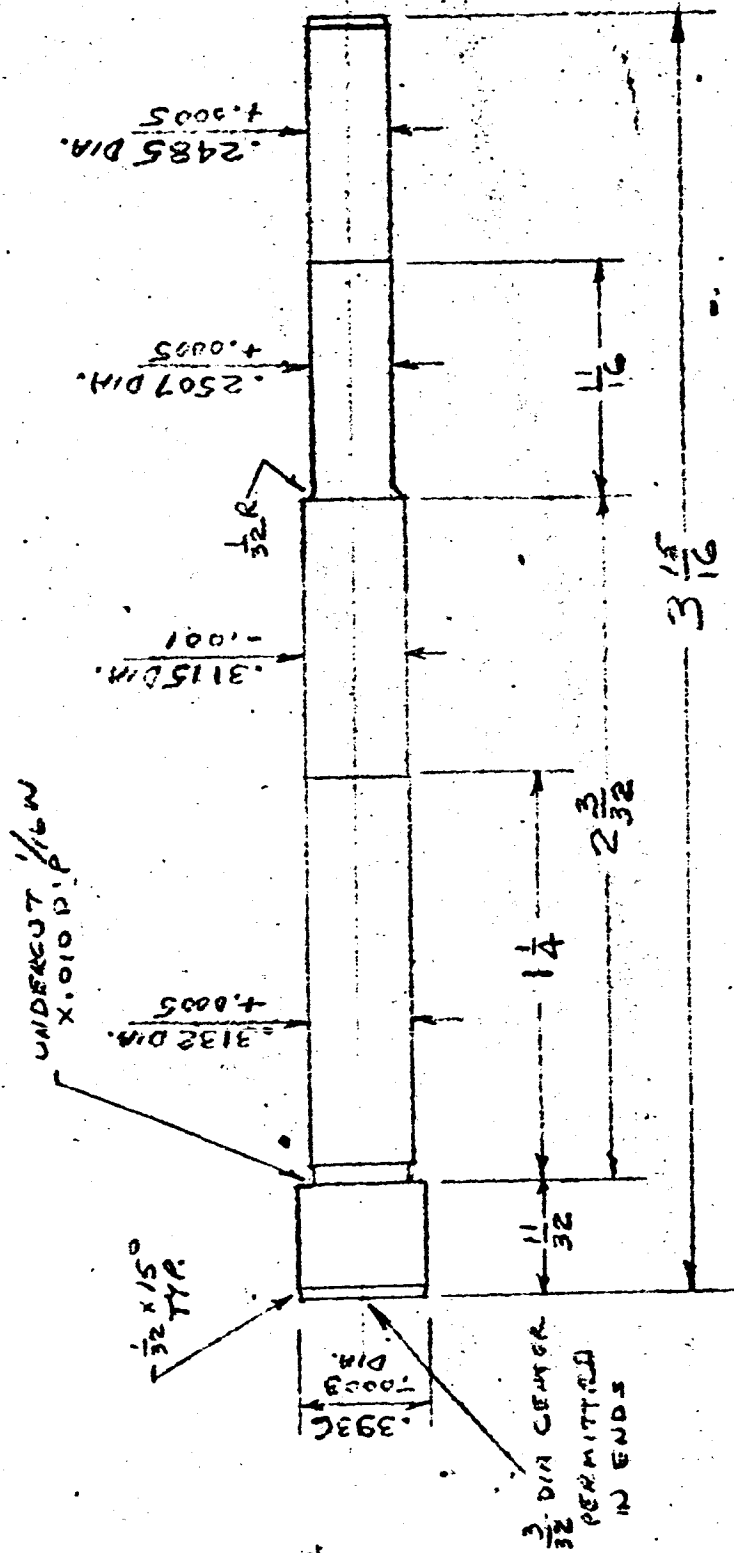
AS. 4 Feb '65

4
5
4
2
2
4
2
2
C
T

THE BLACK & DECKER MFG. CO., TOWSON, MD.

3RD INTERM. SHAFT 11374-35

MAT'L: C-1144 STL



THE BLACK & DECKER MFG. CO., THOUSON, MD.

A.S. 4106 '65

LUNAR NASA

ENGINEER'S SKETCH SHEET - FORM 2118

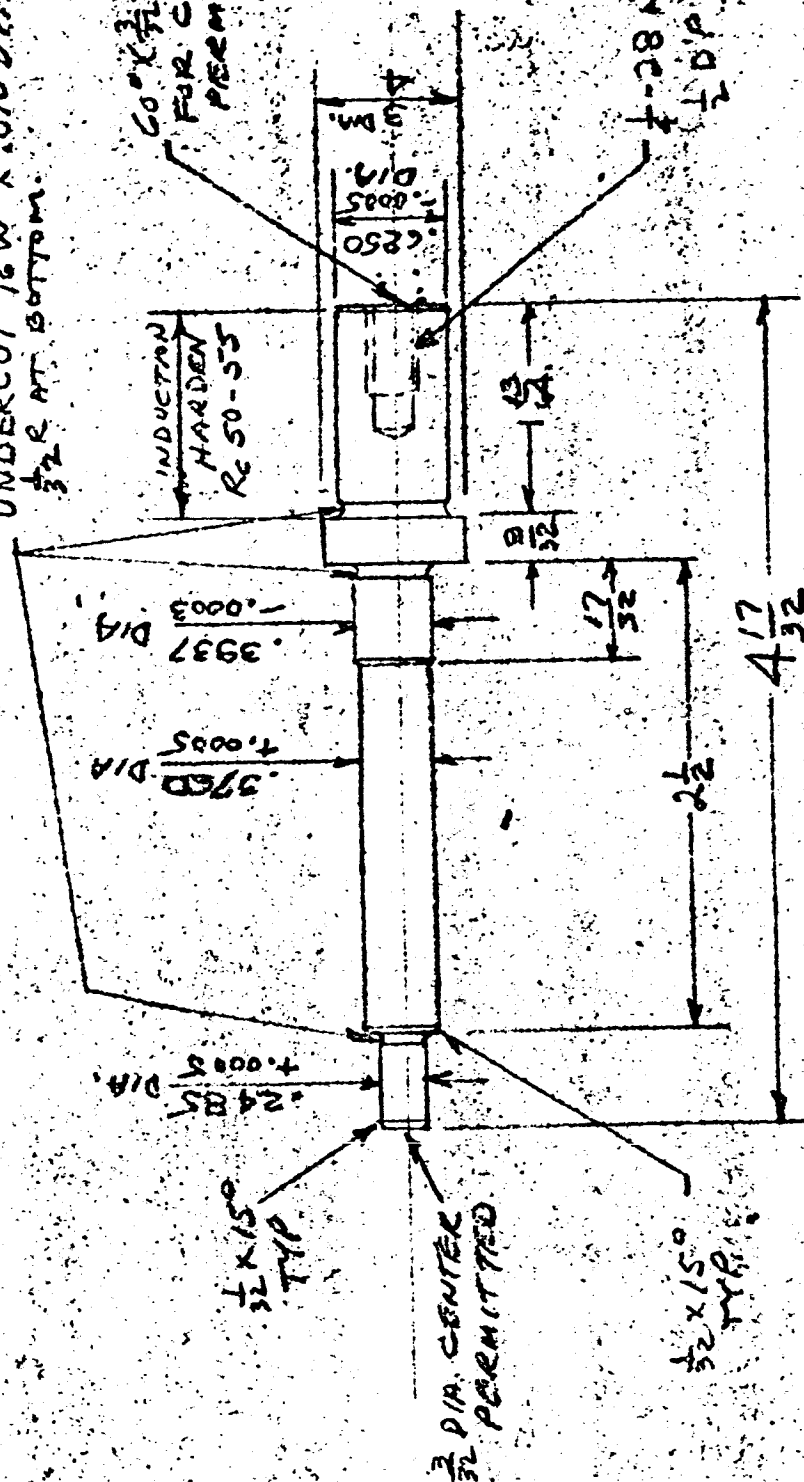
MAT'L :- ETD 180 STEEL

UNDERCUT $\frac{1}{16}$ W X .010 D.P.
 $\frac{1}{32}$ R AT BOTTOM.

60° X $\frac{3}{16}$ BEVEL
FOR CENTER
PERMITTED

INDUCTAN
HARDEN
Rc 50-55

1-28 NPT TAP
 $\frac{1}{16}$ D.P. MIN.



BY ACS
APR

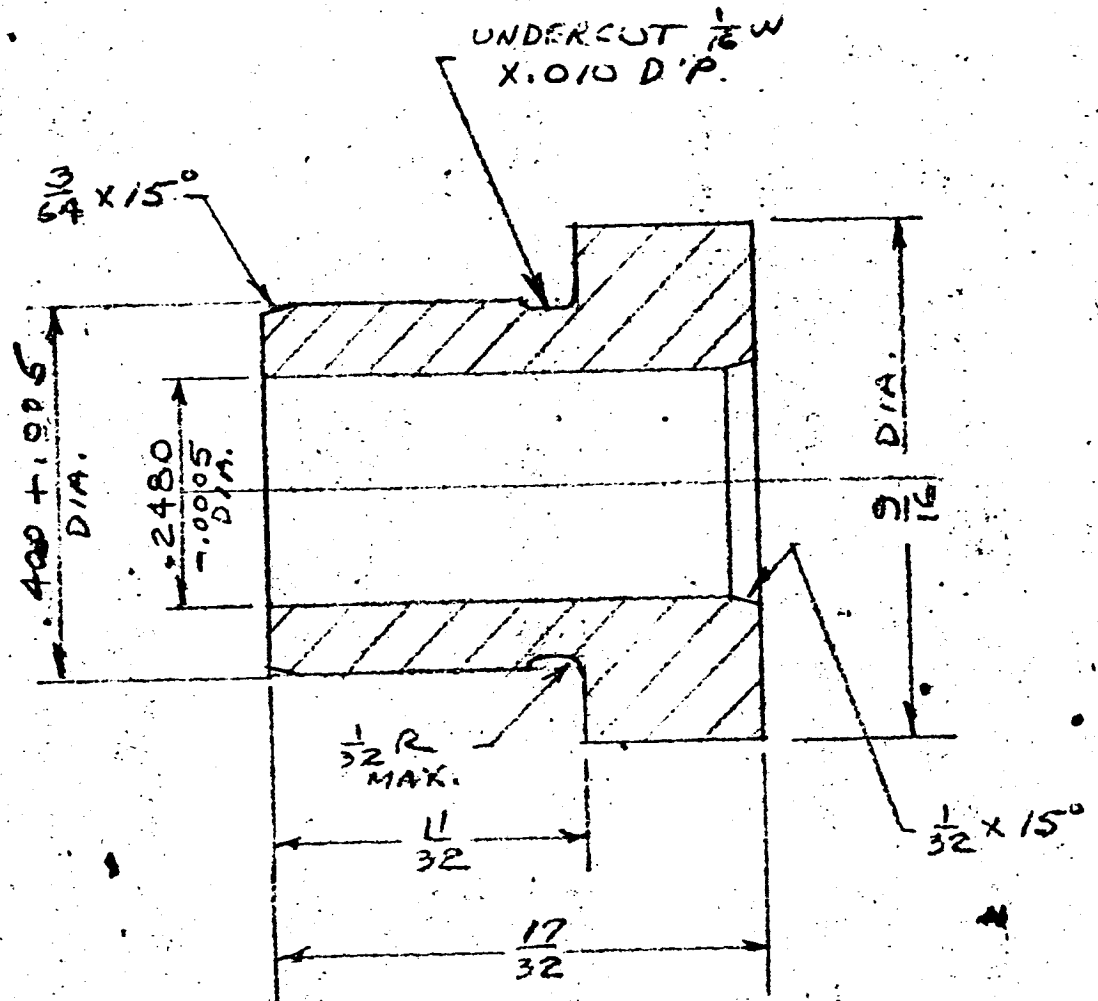
DATE 17 MAY 65
DATE

TITLE FEED PINION SHAFT

11374-36

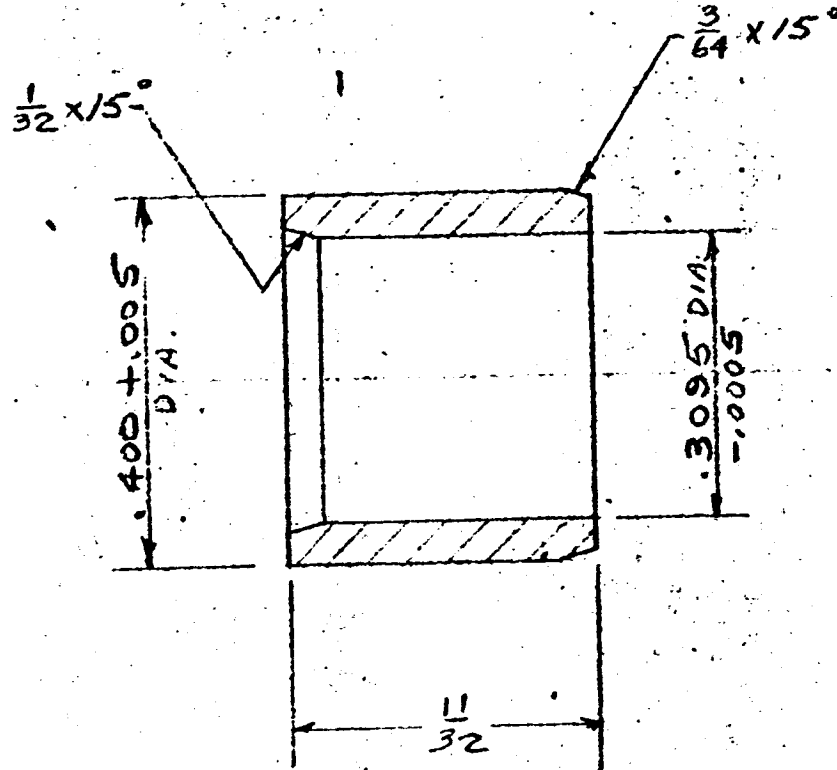
ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L - C.R.S.



ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L - C.R.S.



BY A.S.

DATE

5 Feb '65

TITLE

2ND INTERM. BUSHING

NO.

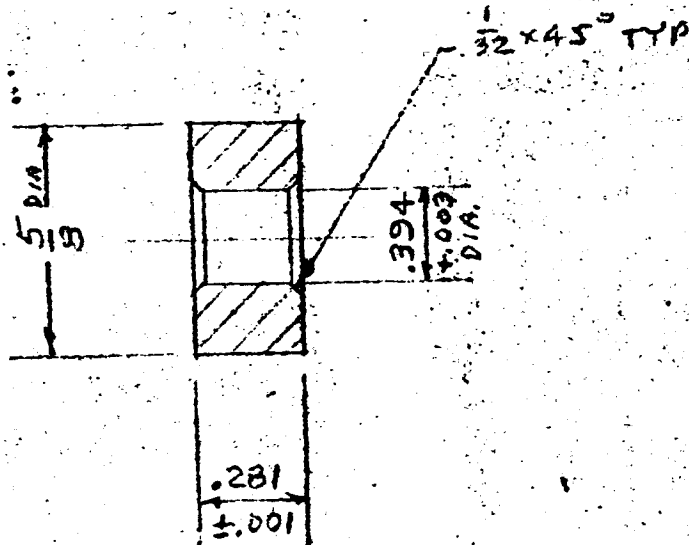
11374-38

APR

DATE

ENGINEER'S SKETCH SHEET - FORM 2718

MAT'L - C.R.S.



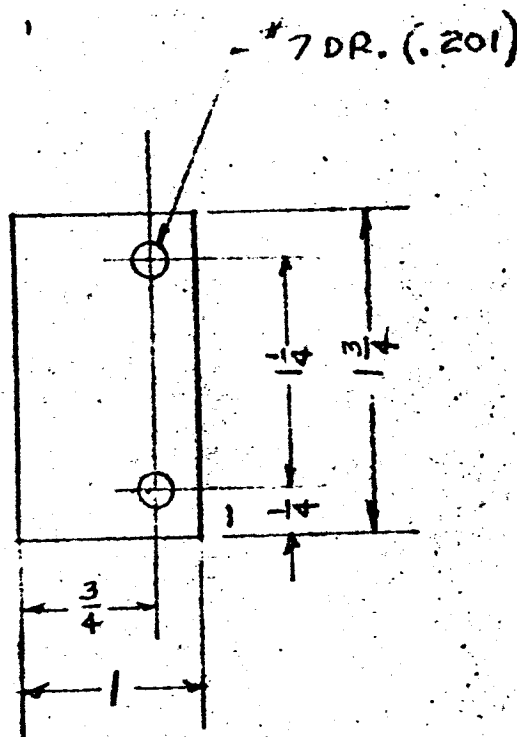
BY AS	DATE 5 Feb '65	TITLE
APR	DATE	

SPACER

11374-39

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L :- .050 TH. ALUM. ALLOY $\frac{1}{2}$ HARD



BY A.S.
APR

DATE
DATE

5 Feb '65

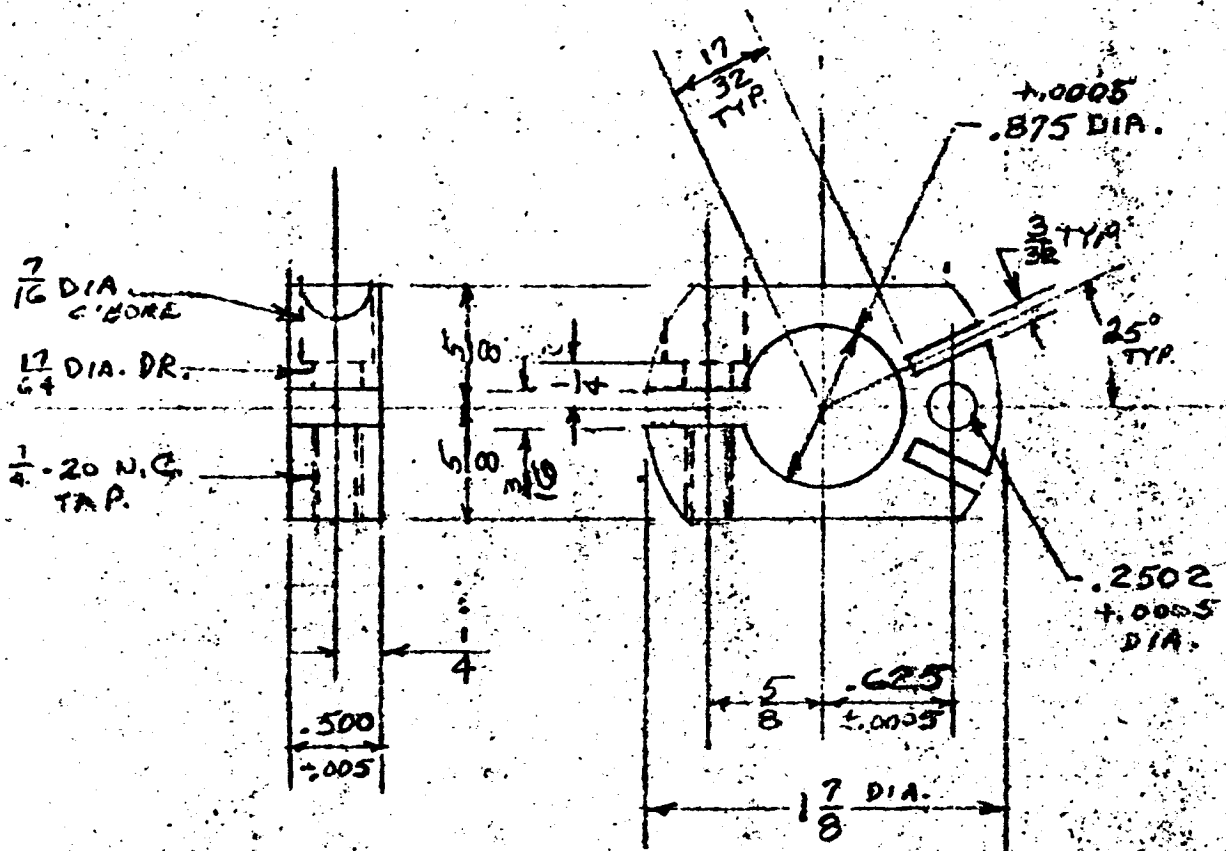
TITLE

COVER PLATE

11374-41

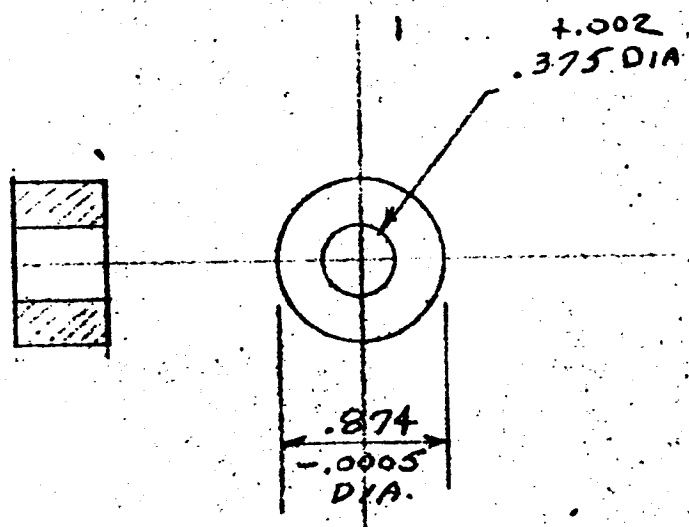
MAT'L :- C.R.S.

ENGINEER'S SKETCH SHEET - FORM 2118

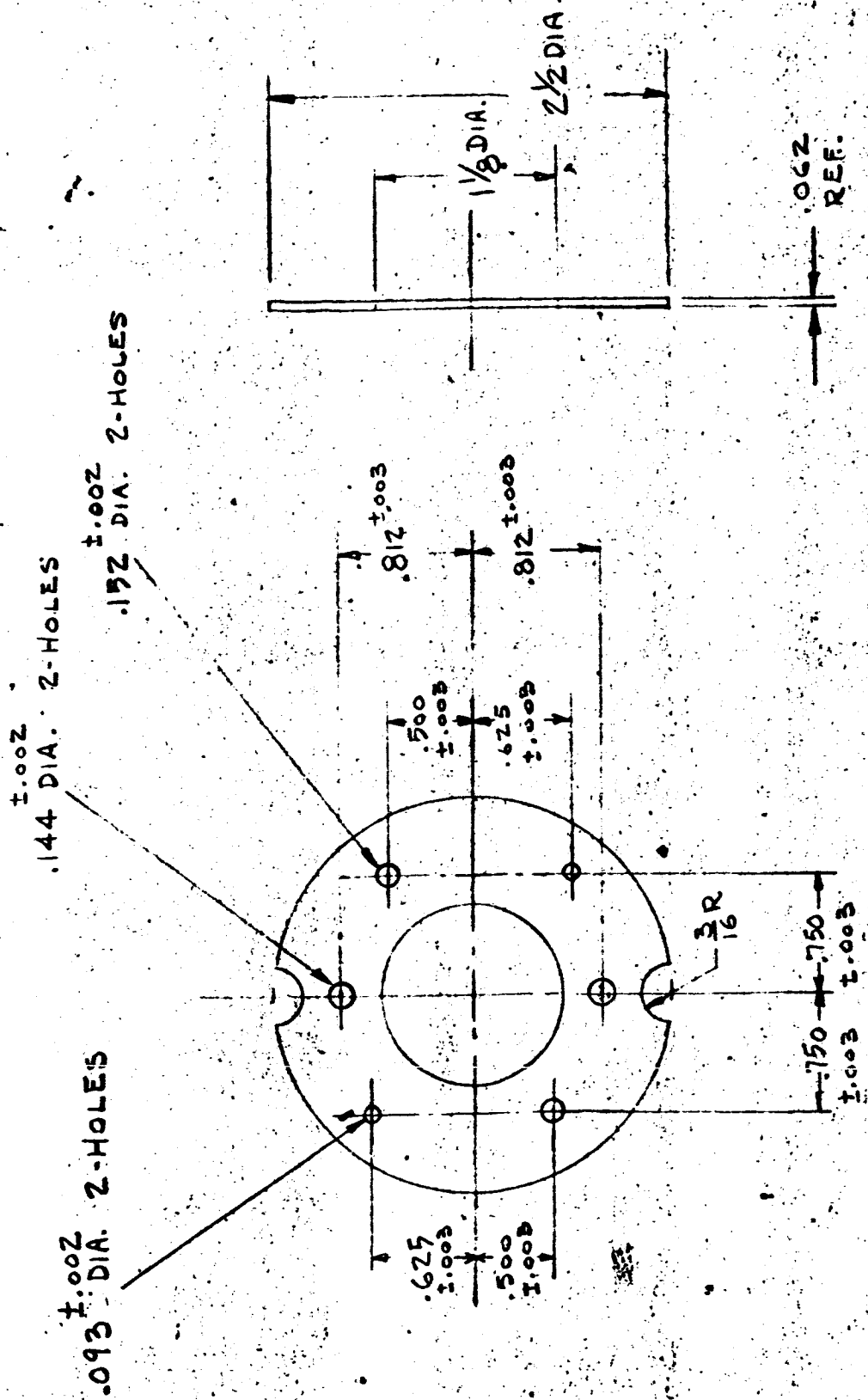


ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L : 1/2" TH. BRAKE LINING
RAYBESTOS GRADE 2959-5.



BY A.S.	DATE 5 Feb 65	TITLE SLIP CLUTCH LINING	11374-43
APR	DATE		

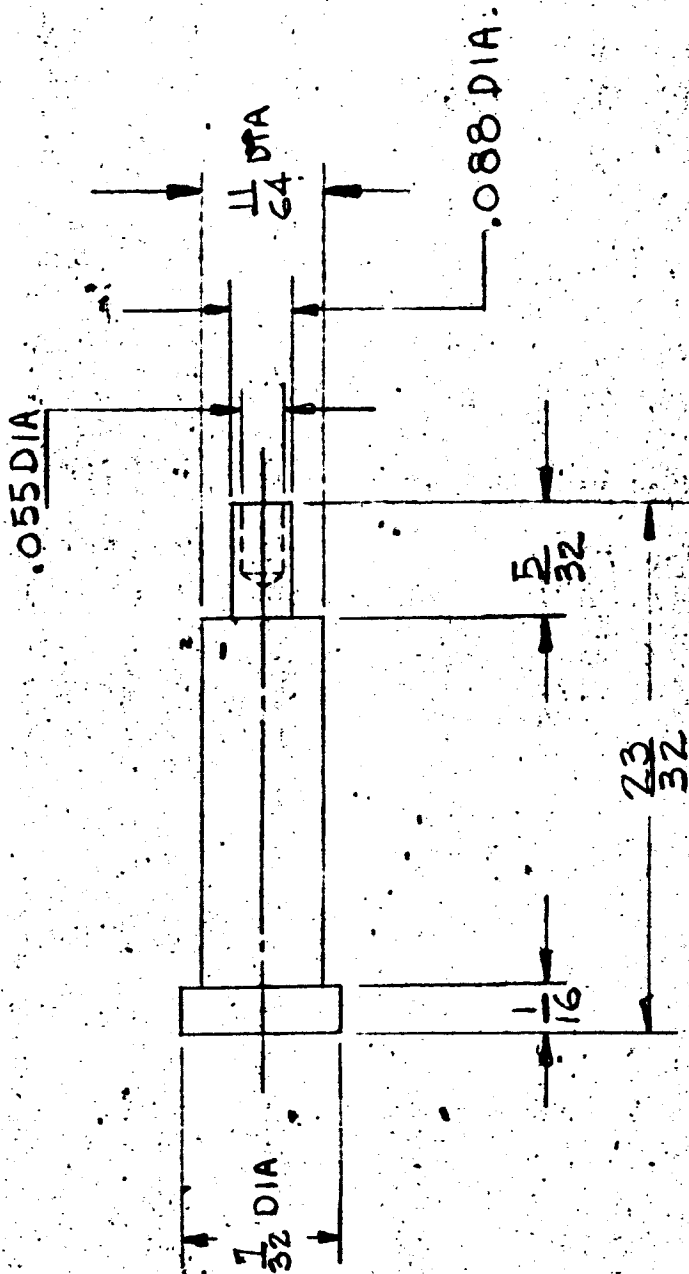


1/16 THK. MELAMINE FIBERGLASS GRADE G-5
NATIONAL G5-813 OR EQUIV.

REV		A 11374-45	
BRUSH HOLDER		PLATE	
DRN 1-21-65		TOL UNLESS SPECIFIED	
AUD		MTRL CODE	
DE		DWG SCALE 1-1	
EE		DWG SCALE 1-1	
MET		TOL UNLESS SPECIFIED	
AUD		MTRL CODE	
DE		DWG SCALE 1-1	
EE		DWG SCALE 1-1	

STAR	MEX C	FRAN	CROY	BROC	MAID	HARM	DWLT	HAMP	TSN-M	TSN-E
------	-------	------	------	------	------	------	------	------	-------	-------

A



PENTRATE

REV

SHOULDER RIVET

MATL C1215

CODE 61150Q25

DWG SCALE 4-1

DRN 31-65

AUD

DE

EE

A 11374-46

MET

PEM

DM

STAR

MEX C

FRAN

CROY

BROC

MAID

HARM

DWLT

HAMP

TSN-M

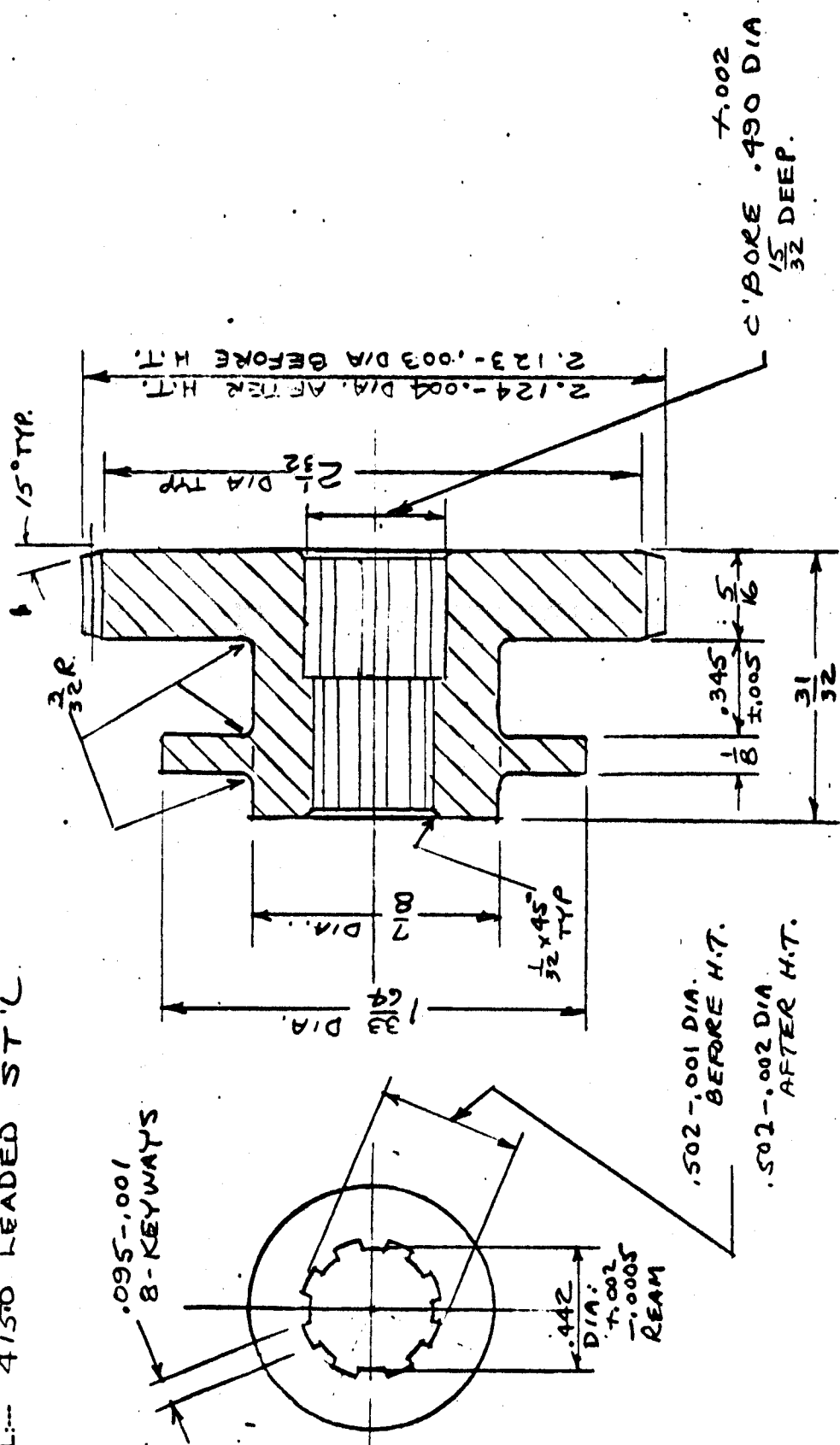
TSN-E

SHIFTING GEAR

NO. 11374-48

NO. REQ'D , PATTERN NO.

MATERIAL: 4150 LEADED ST' L



NORMALIZE	1
ANNEAL	
CARBURIZE	
CYANIDE	
COOL IN	
HEAT AT 1530°F IN SALT	
QUENCH IN SALT @ 450°F	
FOR 5 MIN.	
QUENCH IN	
DRAW AT 450°F MIN	
ROCKWELL C 44-48	
MET. APP'D.	
NOTE	

GEAR DATA		BEFORE HEAT TREAT		AFTER HEAT TREAT	
NUMBER OF TEETH		PINION	GEAR	PINION	GEAR
NORMAL DIAMETRAL PITCH			65		65
NORMAL PRESSURE ANGLE			32		32
HELIX ANGLE			20°		20°
STANDARD PITCH DIAMETER			0" H.		0" H.
TOOTH FORM			2.03125 LONG. ADD.		2.03125 LONG. ADD.
CALC. CIRC. TOOTH THICKNESS ON STD. PITCH CIRCLE			0.0597		0.0604
AGMA QUALITY CLASS			9		8
MASTER GEAR BASIC CIRCULAR TOOTH THICKNESS			0.0491		0.0491
MASTER GEAR NUMBER OF TEETH			72		72
TESTING PRESSURE IN OUNCES			24		24
MAXIMUM TOTAL COMPOSITE ERROR			0.0019		0.0027
MAXIMUM TOOTH TO TOOTH COMPOSITE ERROR			0.0014		0.0019
TESTING RADIUS & TOLERANCE			1.0298-.0010		1.0308-.0020
MEASUREMENT OVER TWO.0617 DIAMETER PINS (REF)			2.1593		2.1611
LEAD					
LEAD ERROR			0.0003		0.0006

HOBGING DATA		GEAR SHAPER DATA	
SINGLE THREAD HOB		GUIDE LEAD	
INDEX GEARS		CUTTER TEETH	
ACTUAL FEED			
FEED GEARS			
HOB HAND			

TOOTH PROFILE	
PINION	GEAR
BASE RADIUS	BASE RADIUS
54	54
48	48
42	42
36	36
30	30
24	24
18	18
12	12
6	6
0.0002	0.0002

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

8 Feb '65	AS
FRACTIONAL DIMENSION TOL. ± .008"	
BREAK ALL SHARP EDGES & BURR	
CHECKED BY	
TRACED BY	
DRAWN BY	

USE ON TYPE

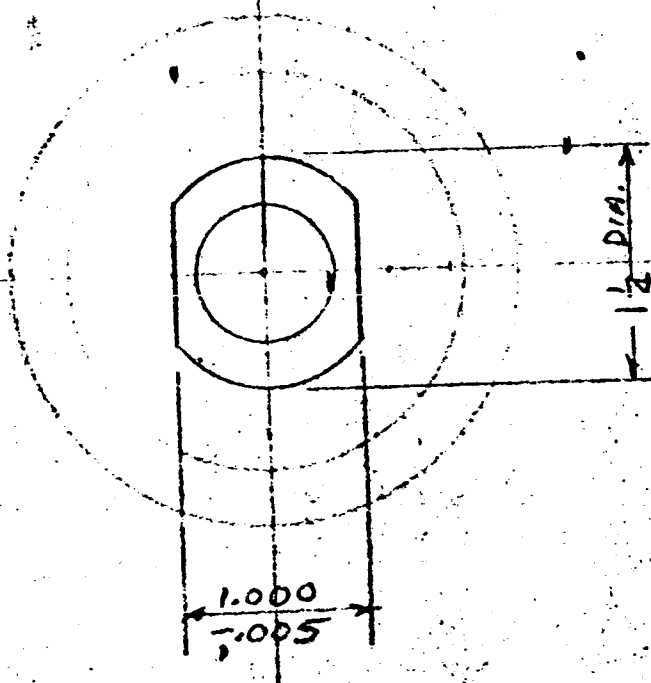
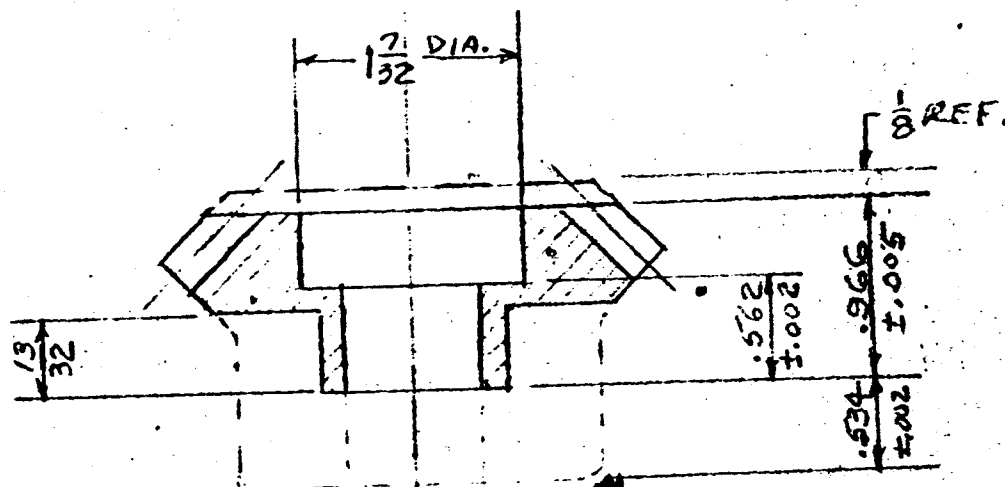
LUNAR NASA

FORM 4048 500 7-62
SPEIDEL & CO., INC. NO. 1D44

THE BLACK AND DECKER MFG. CO. TOWSON, MD.

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L :- L130Y BOSTON
MITER GEAR.



BY AS

DATE 9 Feb 65

APR

DATE

TITLE

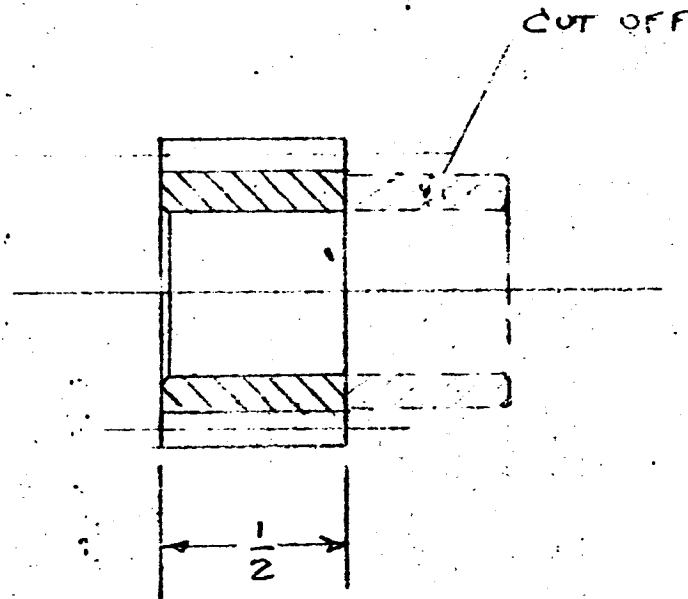
SPINDLE OUTPUT GEAR

DATE

11374-50

ENGINEER'S SKETCH SHEET - FORM 211B

MAT'L - YA 15 BOSTON SPUR
GEAR.



BY A-5
APR

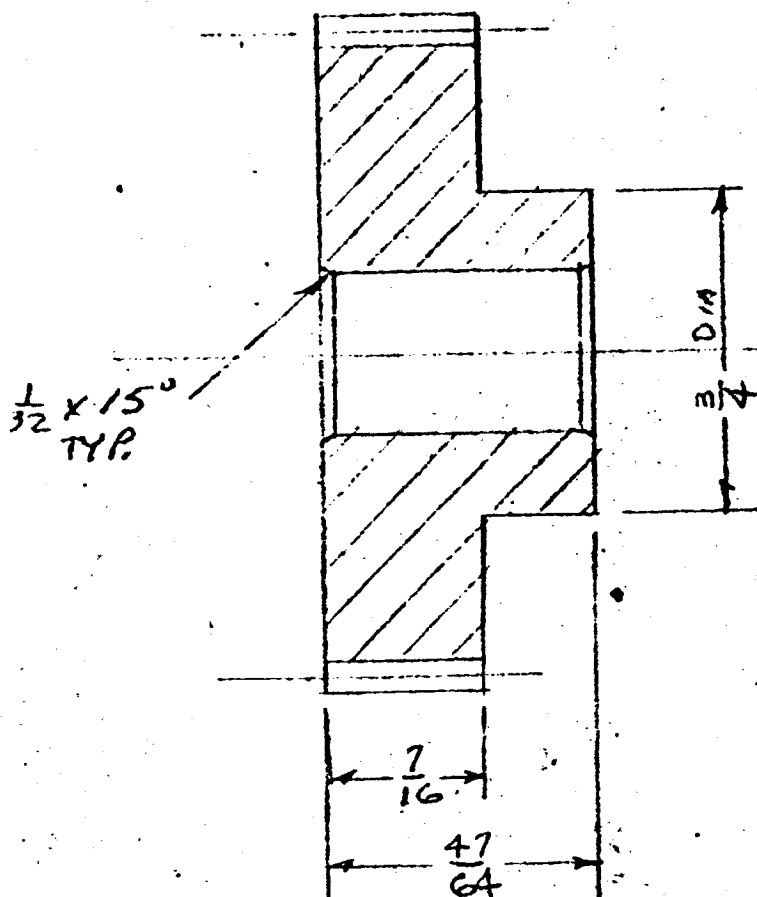
DATE 9 Feb '65
DATE

TITLE 1ST INTER FEED PINION

11374-51

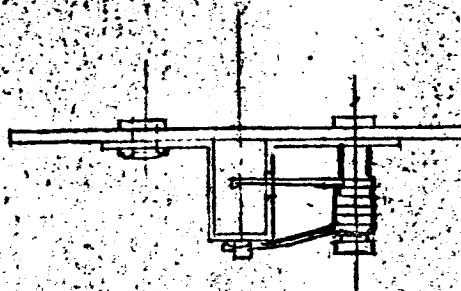
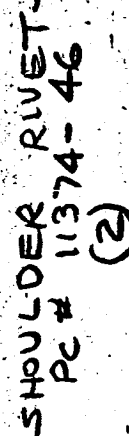
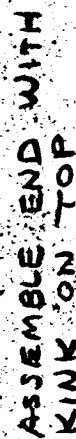
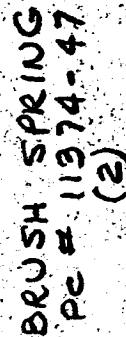
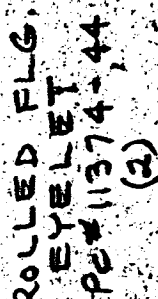
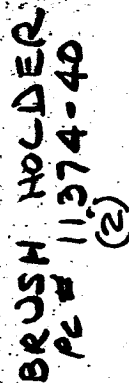
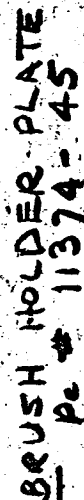
MAT'L :- YA35 BOSTON SPUR
GEAR.

ENGINEER'S SKETCH SHEET - FORM 2118



BY A.S.	DATE 9 Feb '65
APR	DATE

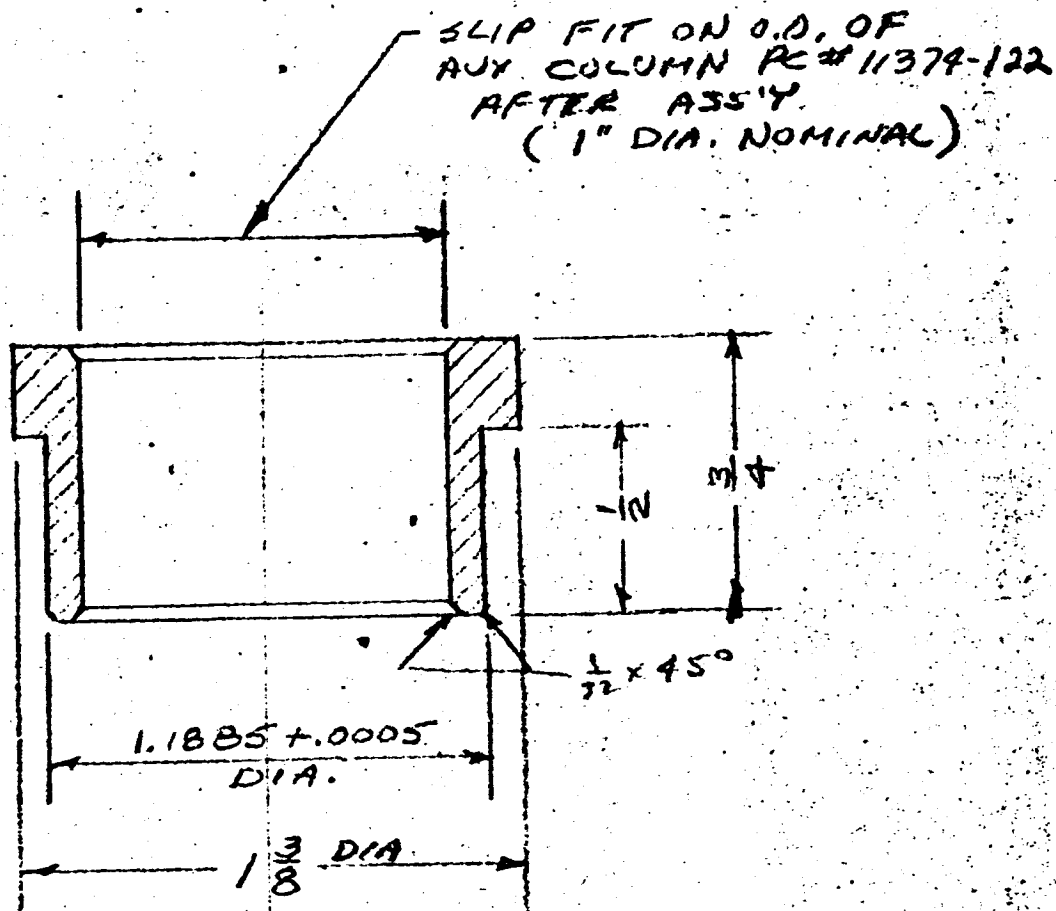
TITLE 2ND INTER. FEED GEAR	11374-52
----------------------------	----------

[illegible]

	MET	DRN.	TOL UNLESS SPECIFIED	MATL	S.A. BRUSH HOLDER PLATE	REV
	AUD	AUD		CODE		
	PEN	DE				
	DM	EE		DWG SCALE		
						A 11374-53

ENGINEER'S SKETCH SHEET - FORM 2118

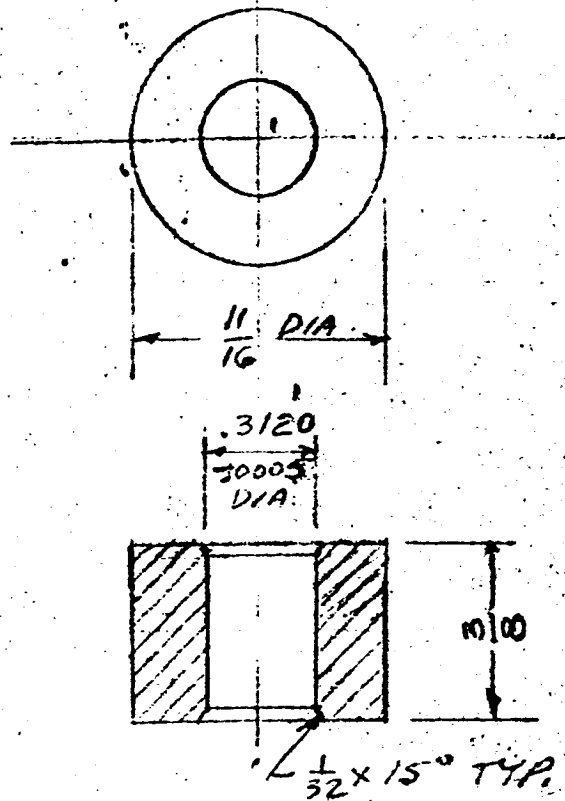
MAT'L: SINTERED IRON
BEARING MAT'L.



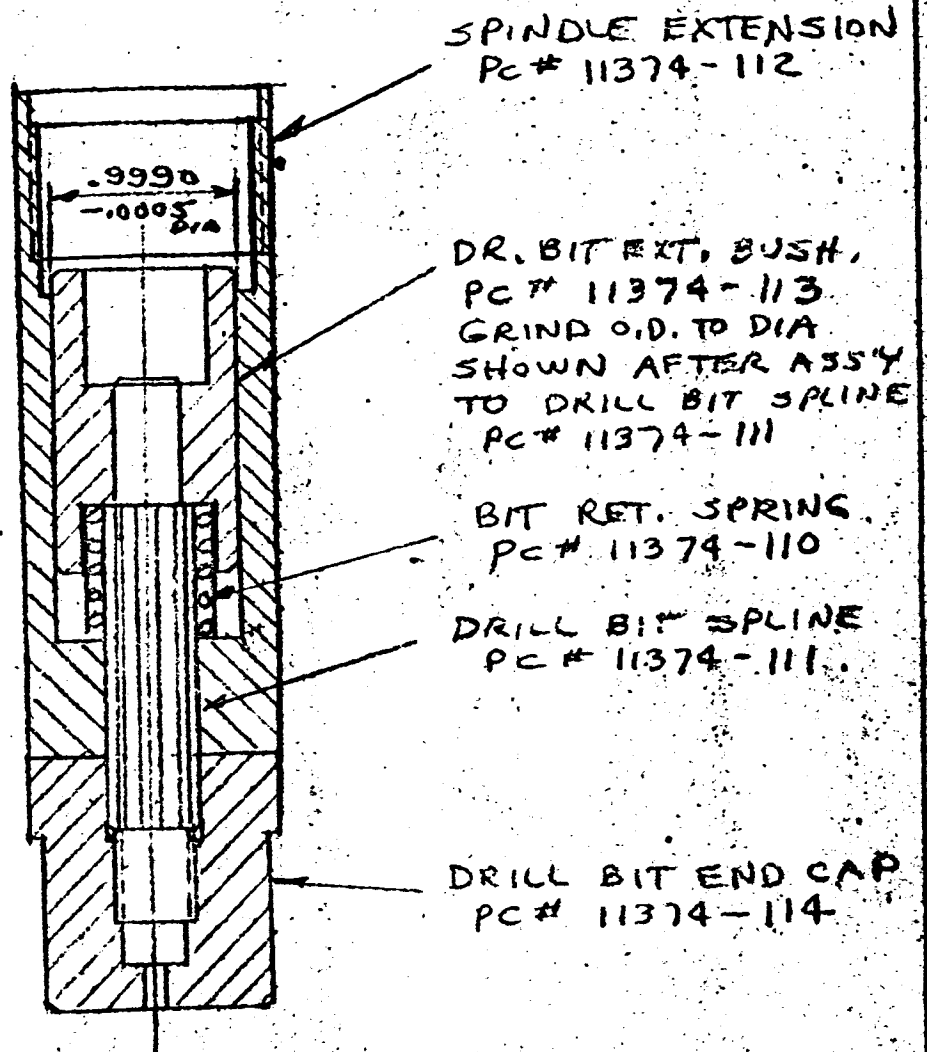
BY A.S. DATE 9 Feb '65
APR DATE

TITLE GUIDE POST BEARING 11374-54

MAT'L: ALUM ALLOY $\frac{1}{2}$ HARD



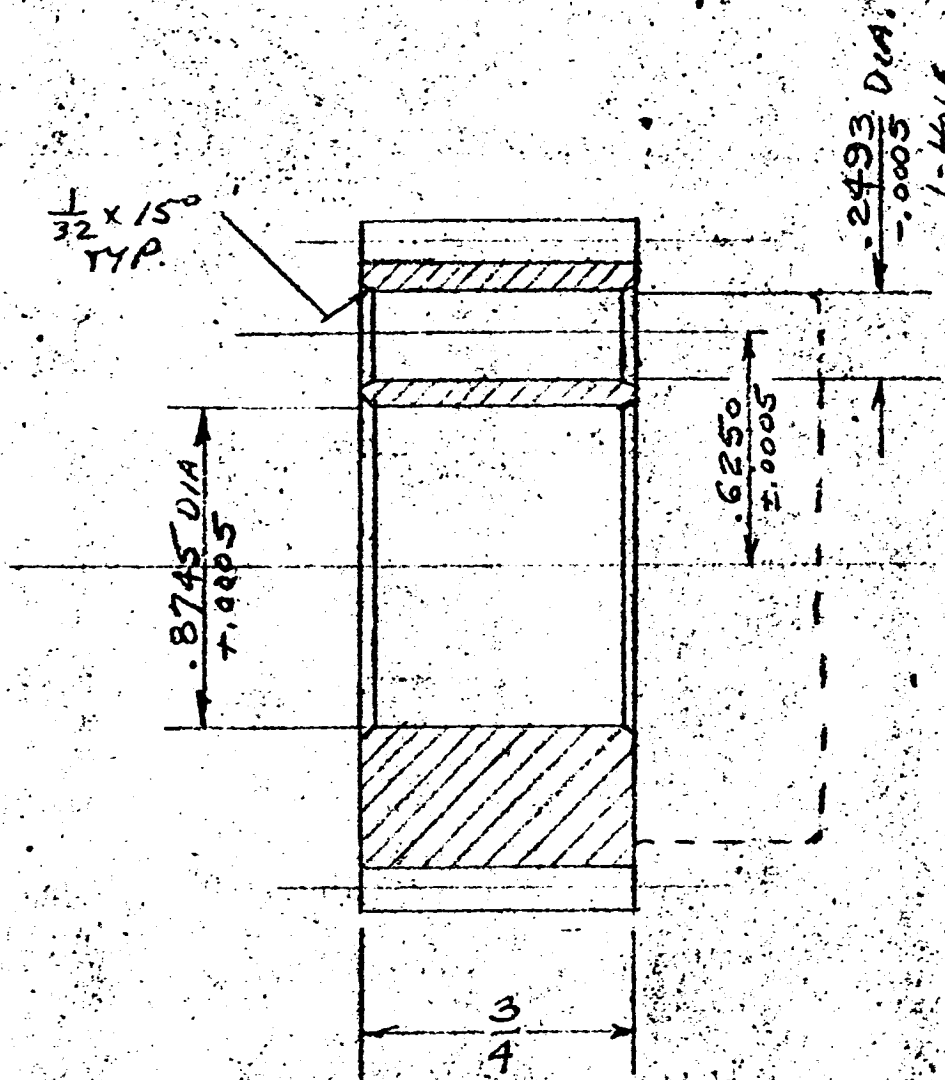
ENGINEER'S SKETCH SHEET - FORM 2/18



BY A. S.	DATE 15 JUN 65	TITLE	DRILL BIT SPLINE ASSY 11374-56
APP	DATE		

BY A.S. DATE 10 Feb 65 SUBJECT RACK PINION SHEET NO. 1 OF 1
CHKD. BY DATE JOB NO. 11374-57

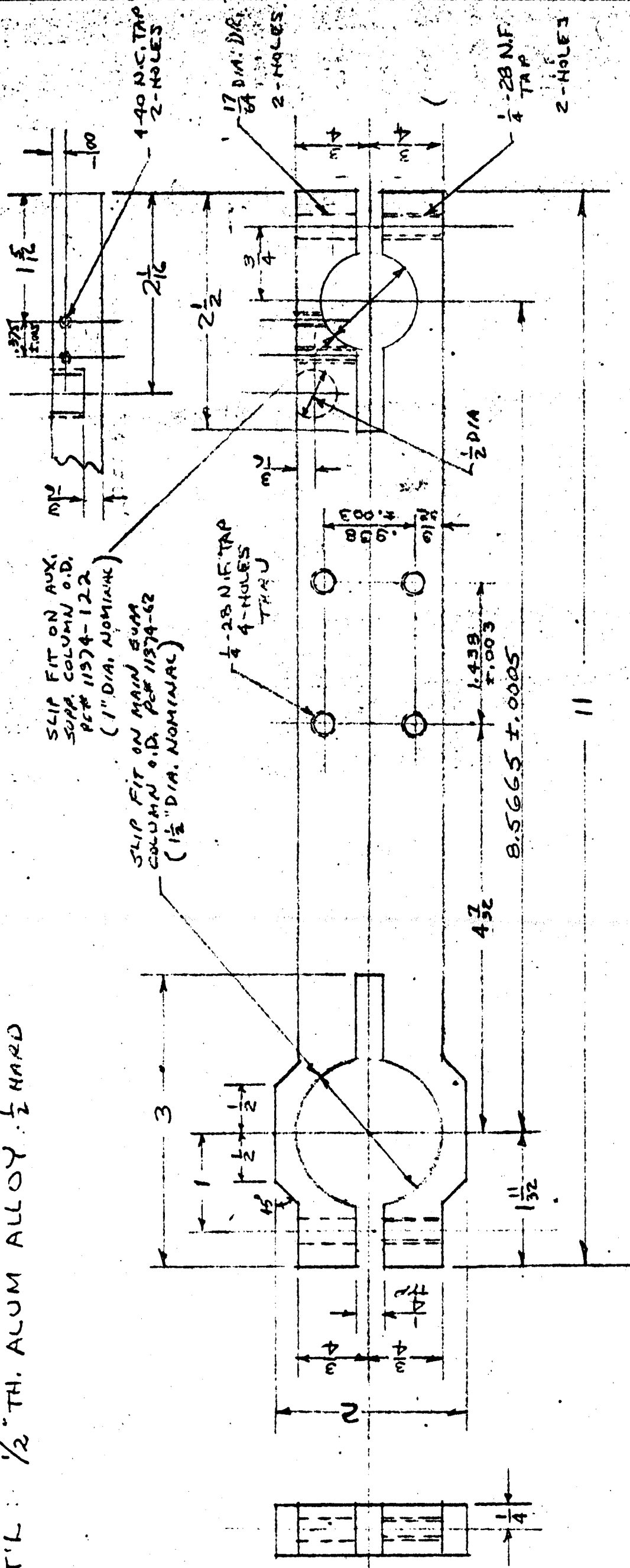
MAT'L :- YB28 BOSTON SPUR GEAR



THE BLACK & DECKER MFG. CO., TOWSON, MD.

11374-58

MAT'L: $\frac{1}{2}$ " TH. ALUM ALLOY: $\frac{1}{2}$ HARD



LUNAR NASAS

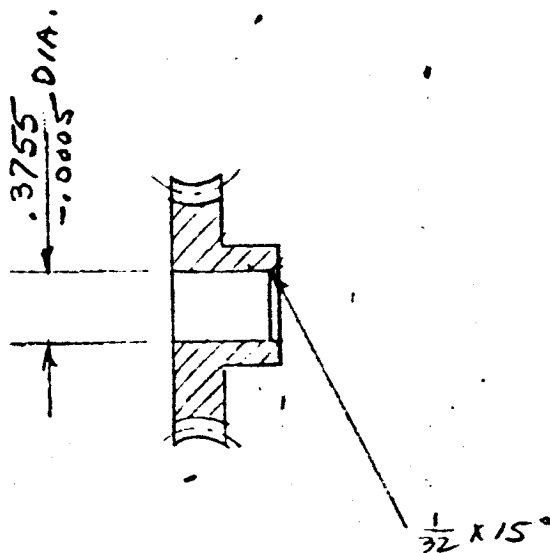
AS 11 Feb 65.

THE BLACK & DECKER, MFG. CO., TOWSON, MD.

TO W. SON, M.D.

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: - "BOSTON" BRONZE WORM GEAR
CAT NO. G 1042 PC# 11374-139



BY A S
APR

DATE 14 JUN 63
DATE

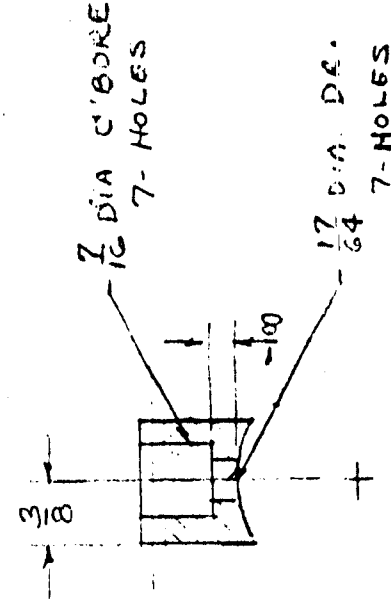
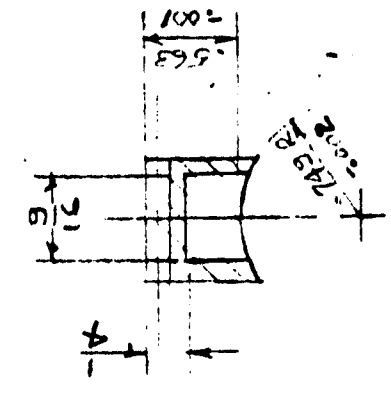
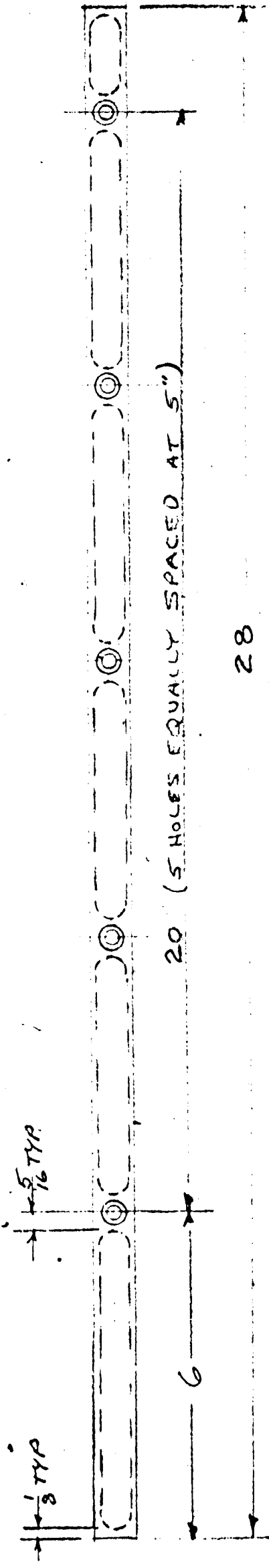
TITLE

FEED SHAFT WORM GEAR 11374-59

FEED RACK

11374-60

NAT'L: L2016 BOSTON GEAR RACK



TYP. HOLE DETAIL

LUNAR NASA

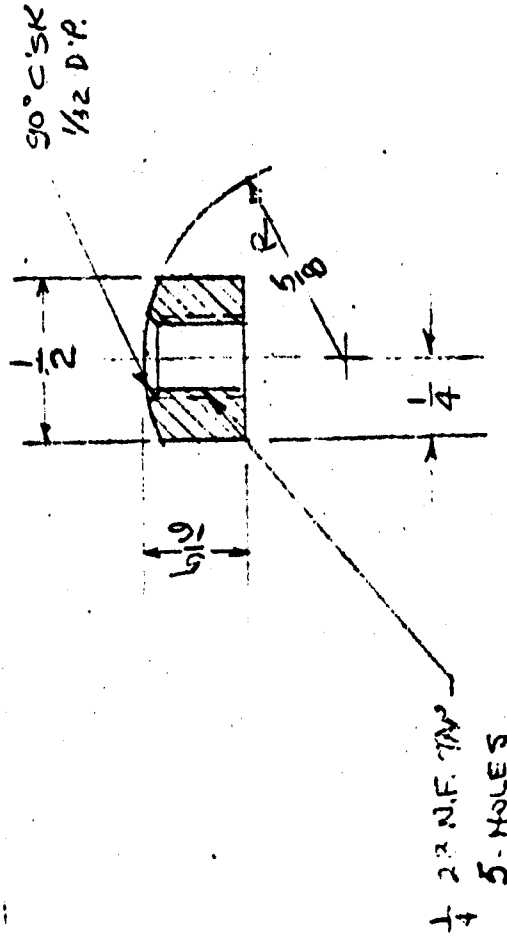
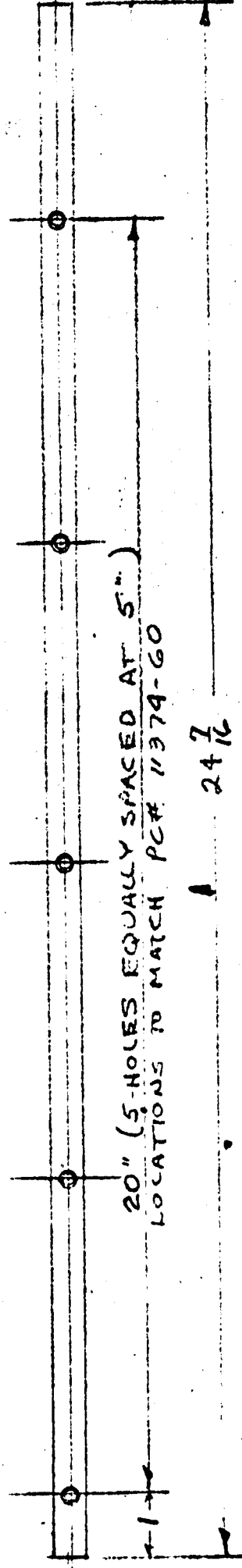
NS. 15 Feb 65

THE BLACK & DECKER MFG. CO. TOWSON, MD.

FEED RACK PLATE

11374-G1

MAT'L: C.R.S.



THE BLACK & DECKER MFG. CO., TOWSON, MD.

A.S. 15 Feb 61

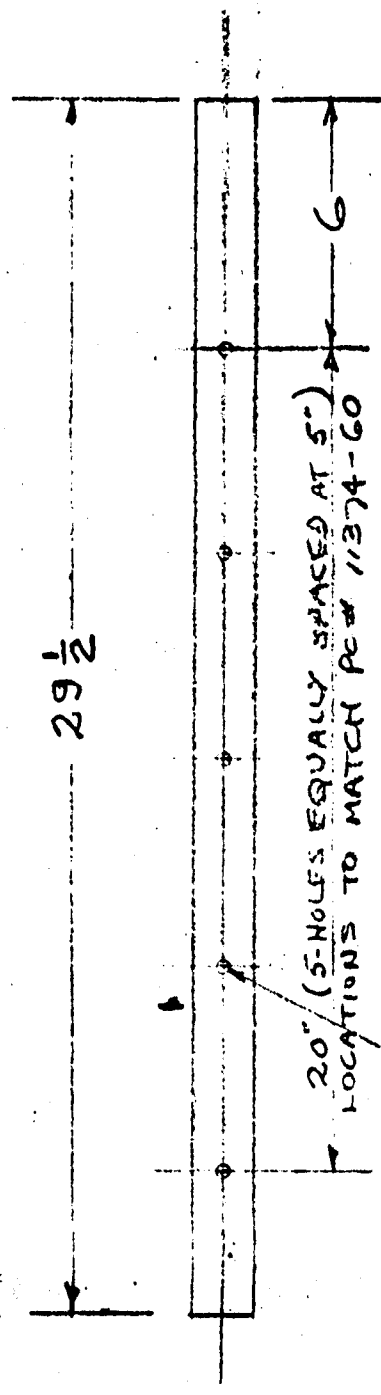
LUNAR NASA

MAIN SUPPORT COLUMN

11374-62

MAT'L:- ALUM. TUBING COG1-T6
1 1/2 O.D. X 1/8 WALL

FINISH:- MARTIN HARD COAT
.001-.002 D.P.

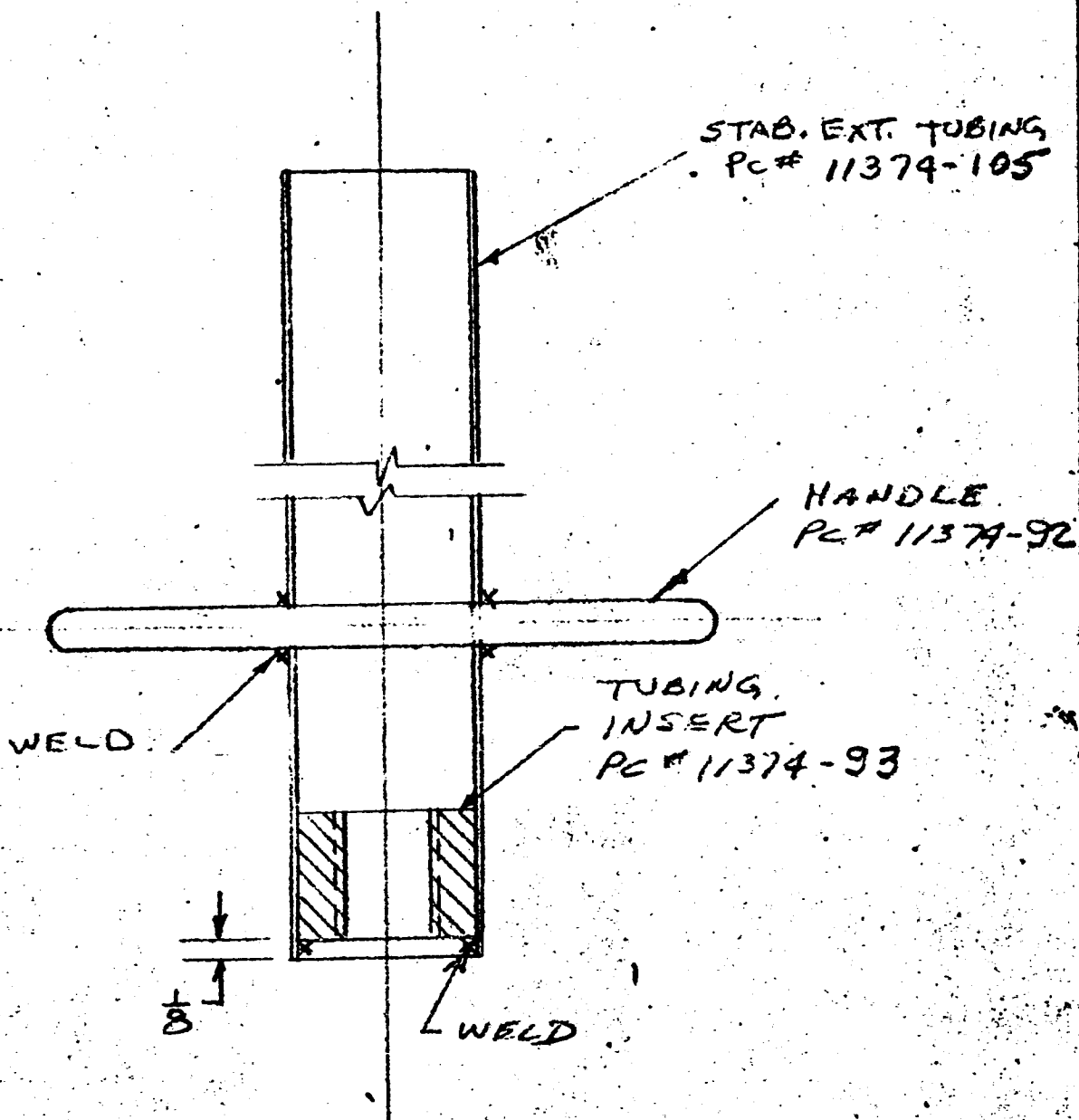


17/64 DIA. DRILL THRU ONE
WALL ONLY
5- HOLES

LUNAR NASA

11/5/56 65

THE BLACK & BECKER MFG. CO., TOWSON, MD.



ENGINEER'S SKETCH SHEET - FORM 2118

BEARING ADAPTOR
BUSHING PC# 11374-37

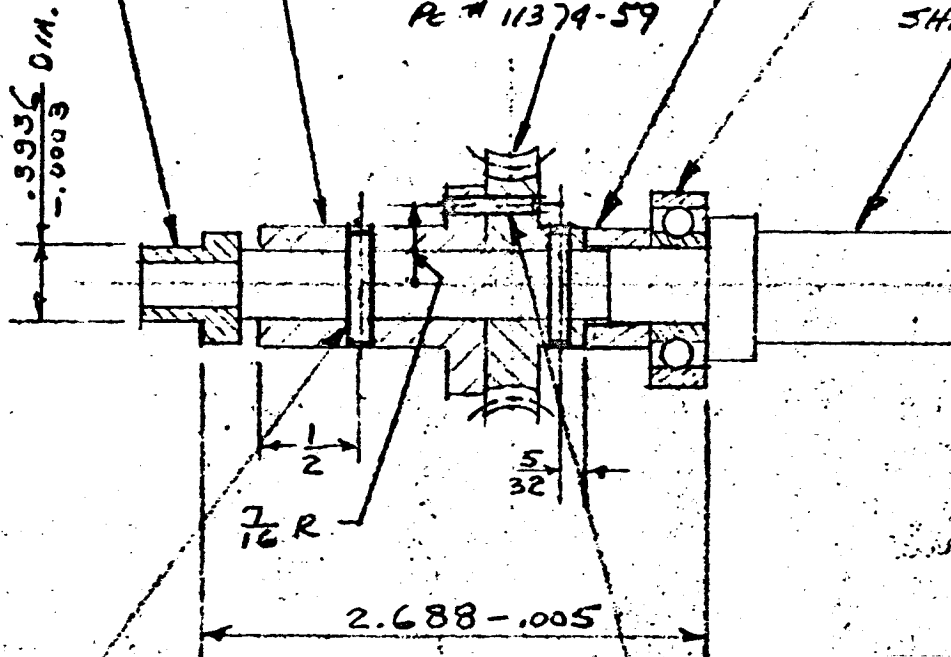
REINFORCING
BUSHING PC# 11374-76

WORM GEAR
PC# 11374-59

SPACER
PC# 11374-39

BALL BEARING,
NEW DEPARTURE
2973 L00 OR EQUIV.
PC# 11374-136

FEED PINION
SHAFT PC# 11374-36

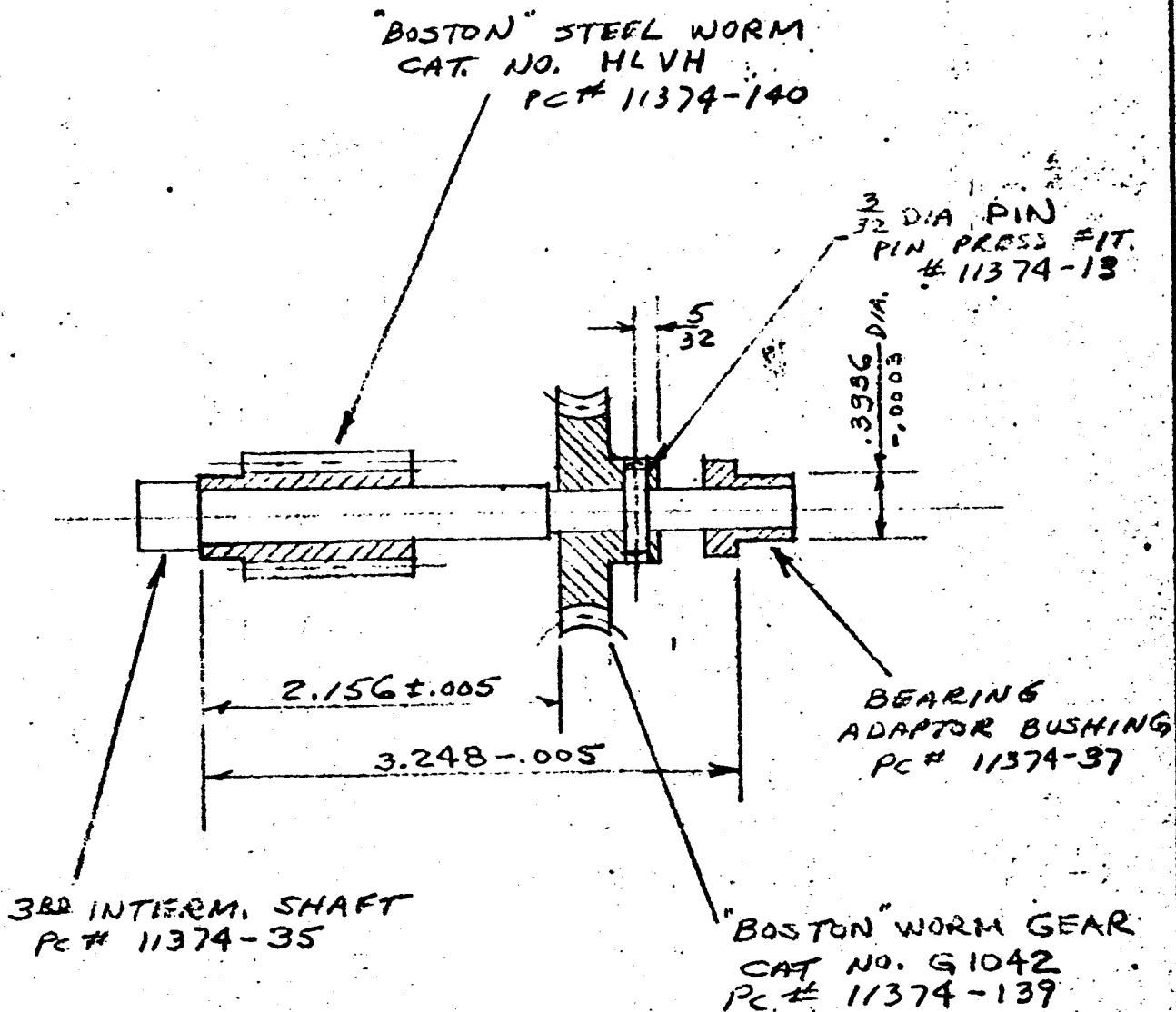


1/8 DIA. ROCKER
2-REQ'D
PRESS FIT.
PC# 11374-8

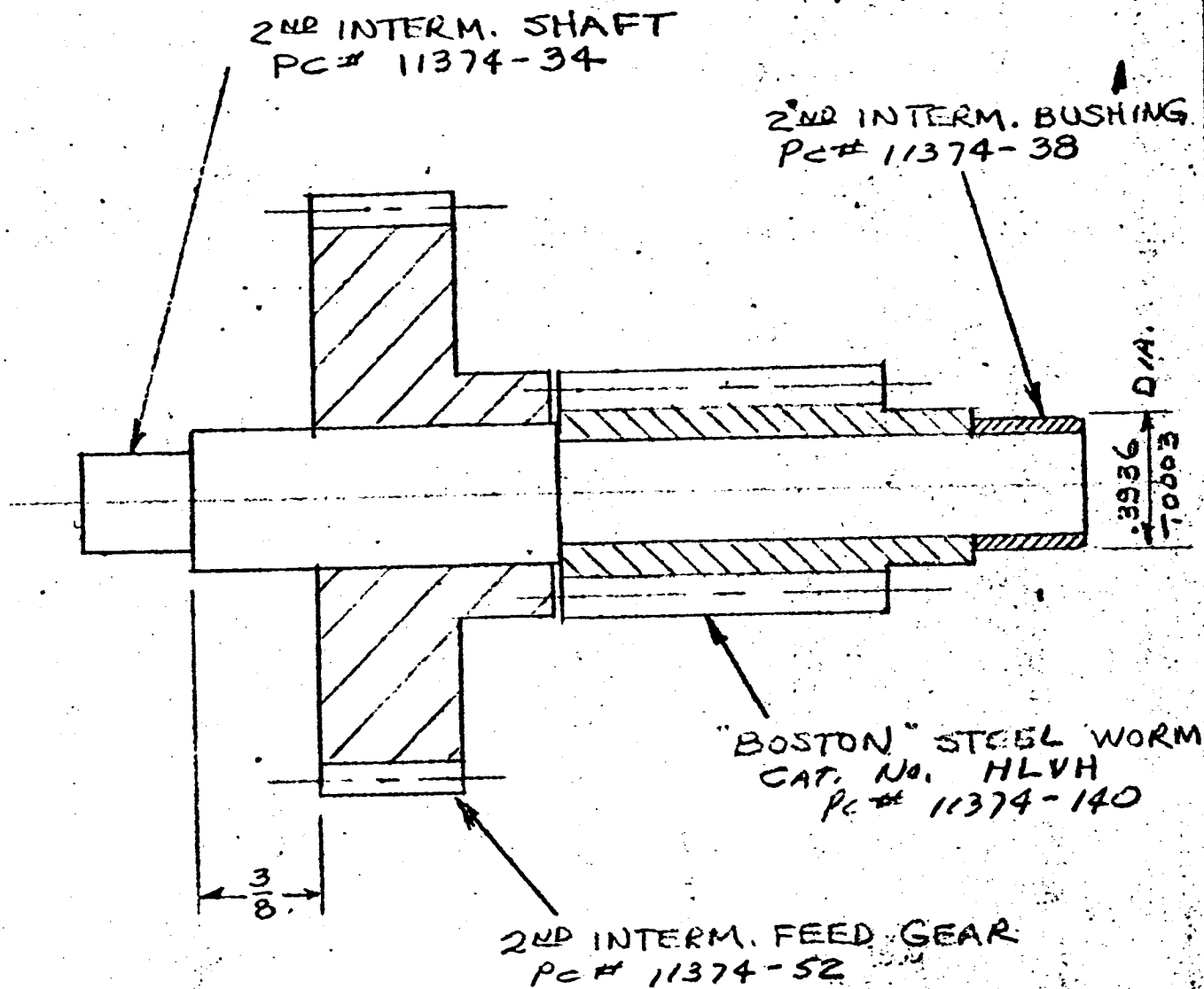
3/32 DIA. PIN
3-REQ'D EQUALLY
SPACED
PRESS FIT.
PC# 11374-13

BY AS	DATE 11 JUNE 65	TITLE	FEED PINION SHAFT ASSY	11374-64
APP	DATE			

ENGINEER'S SKETCH SHEET - FORM 2118



ENGINEER'S SKETCH SHEET - FORM 2118



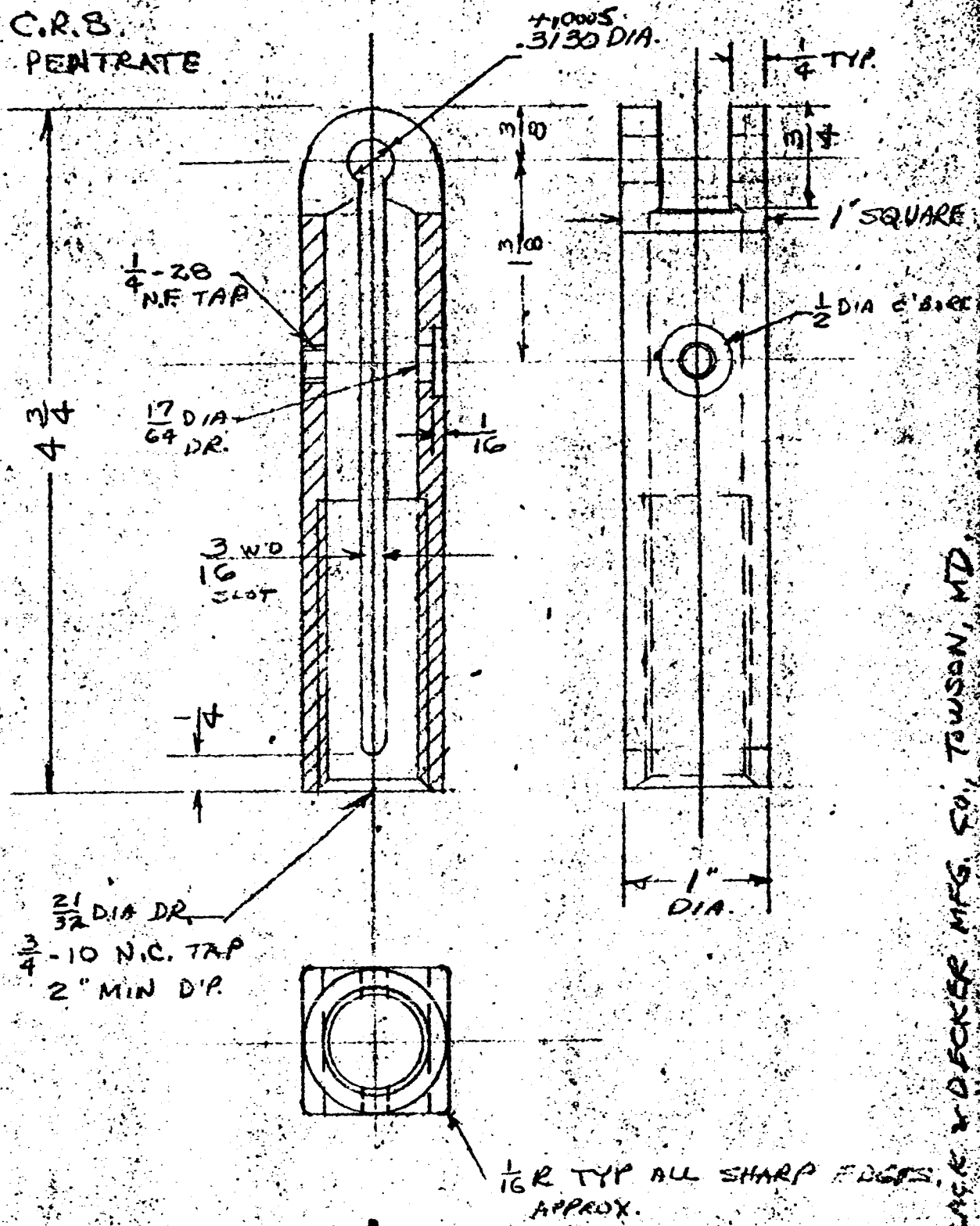
BY A.S.	DATE 10 JUNE 65
APR	DATE

TITLE 2ND INTERM. SHAFT ASS'Y	PC# 11374-67
-------------------------------	--------------

BY ACS DATE 25 FEB 65 SUBJECT STABILIZER
 CHKD. BY _____ DATE _____ PIVOT
BRACKET

SHEET NO. _____ OF _____
 JOB NO. 11374-68

MAT'L: C.R.B.
 FINISH: PENTRATE



LUNAR NASA

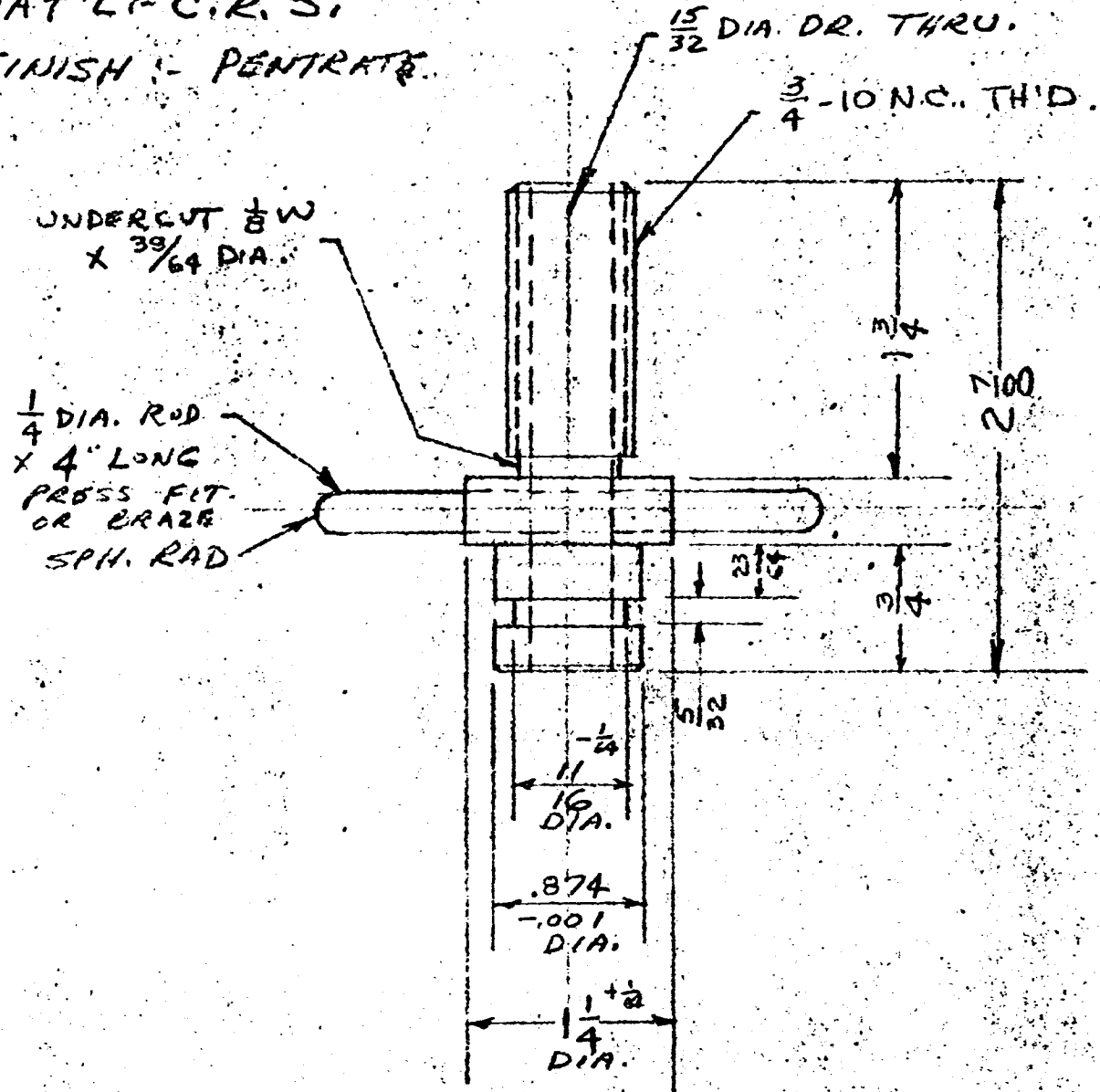
THE BLACK & DECKER MFG. CO., TOWSON, MD.

BY ACS DATE 25 Feb 65 SUBJECT ADJUSTMENT
 CHKD. BY _____ DATE _____ SCREW

SHEET NO. _____ OF _____
 JOB NO. 11374-69

MAT'L - C.R.S.

FINISH - PENETRAT^E



LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

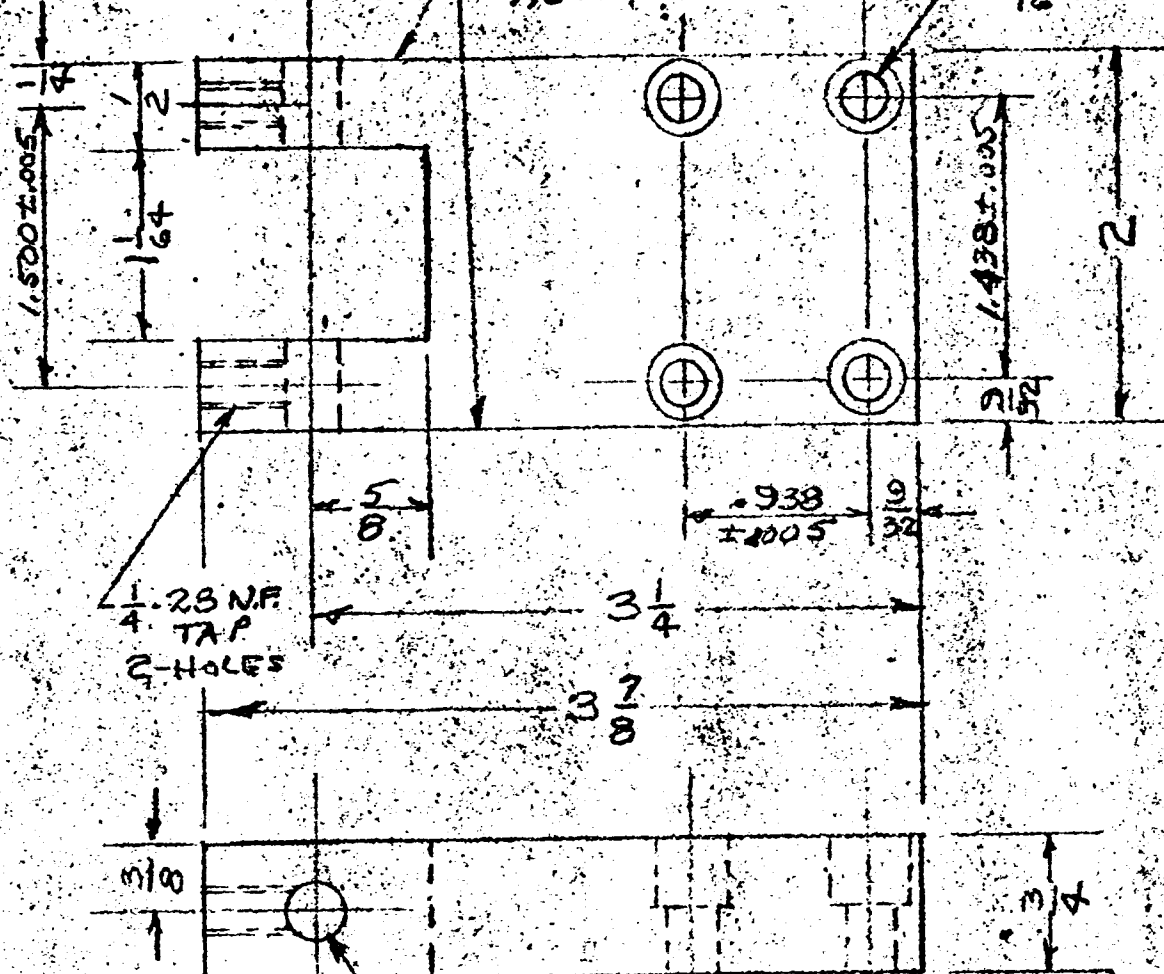
BY ACS DATE 25 Feb 68 SUBJECT STABILIZER
 CHKD. BY _____ DATE _____ SUPPORT
BRACKET

SHEET NO. _____ OF _____
 JOB NO. 11374-70

MAT'L: ALUM. ALLOY, 1/2 HARD

REMOVE SHARP EDGE
 AT BOTTOM SURFACE.
 1/32 R OR CHAMF.

17/16 DIA DR.
 7/16 DIA. CORE X 3/8 DP



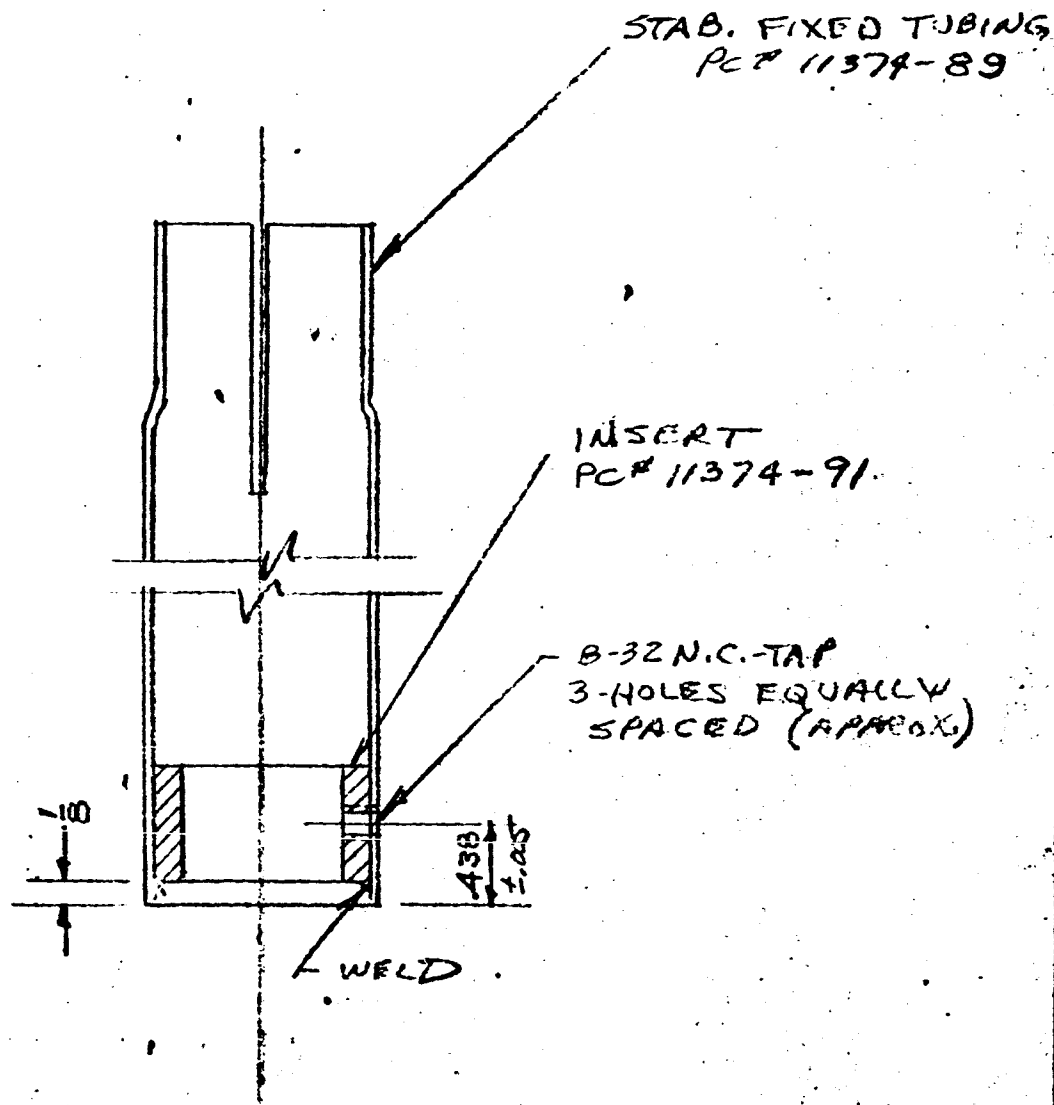
1/4-28 NF
 TAP
 2 HOLES

-.0005
 .3120 DIA

LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

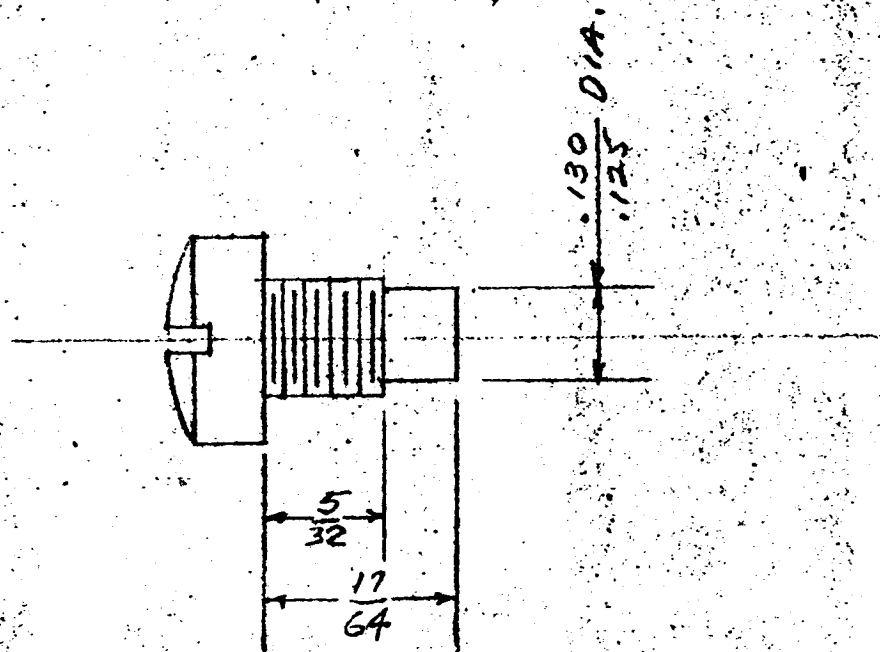
ENGINEER'S SKETCH SHEET - FORM 211B



BY	AS	DATE	9 JUNE 65	TITLE	STAB. TUBING ASS'Y	PC# 11374-71
APR		DATE				

BY ACS DATE 25 FEB 65 SUBJECT RETAINING
CHKD. BY _____ DATE _____ SCREW
SHEET NO. _____ OF _____
JOB NO. 11374-72

MAT'L: #8-32 FIL. HD. SCR., STEEL, CAD. OR NICKEL PL



LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

BY A.S. DATE 26 Feb 65 SUBJECT POINT
CHKD. BY _____ DATE _____

SHEET NO. _____ OF _____
JOB NO. 11374-73

MAT'L :- 4320 ST'L

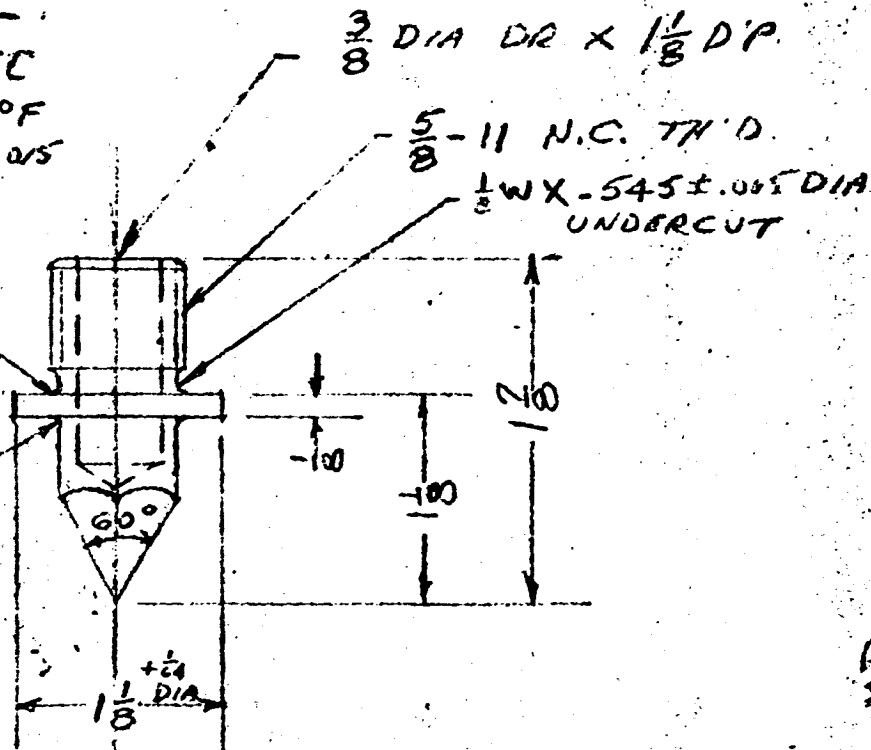
FINISH :- PENTRATE

H.T. :- CYANIDE @ 1650°F
CASE DEPTH .010-.015
OIL QUENCH
REHEAT TO 1500°F
OIL QUENCH
TEMPER @ 300°F
1-HR.

REFRIGERATE @ -120°F
2-HRS
RETEMPER @ 375°F
1-HR.

CASE RSN 89-91.5
CORE Rc 38 MIN.

$\frac{1}{16} R$



.617 SQUARE
.622

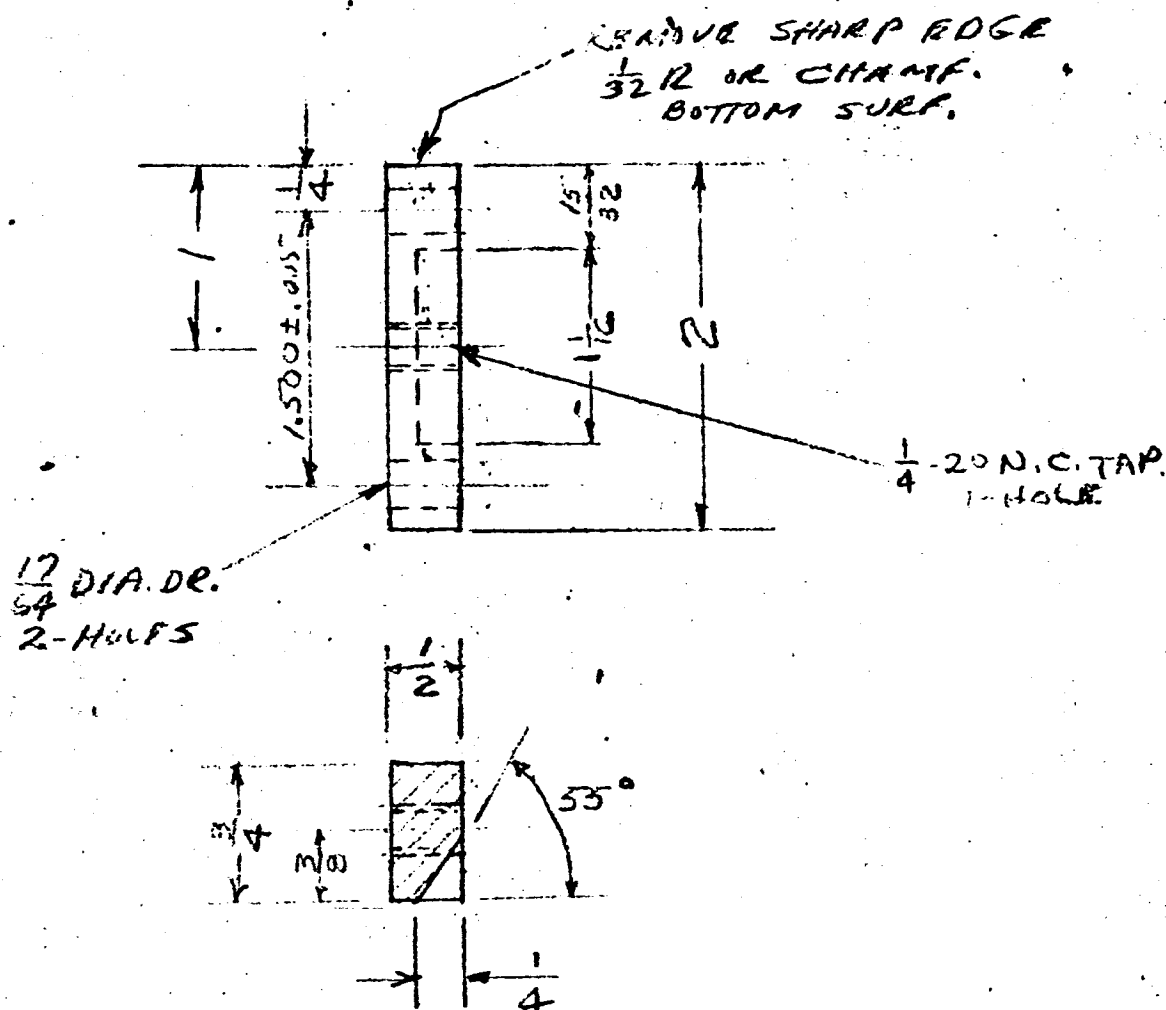
LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

BY ACS DATE 26 Feb 66 SUBJECT PIVOT
CHKD. BY _____ DATE _____ BRACKET STOP

SHEET NO. _____ OF _____
JOB NO. 11374-74

MAT'L: ALUM ALLOY $\frac{1}{2}$ HARD



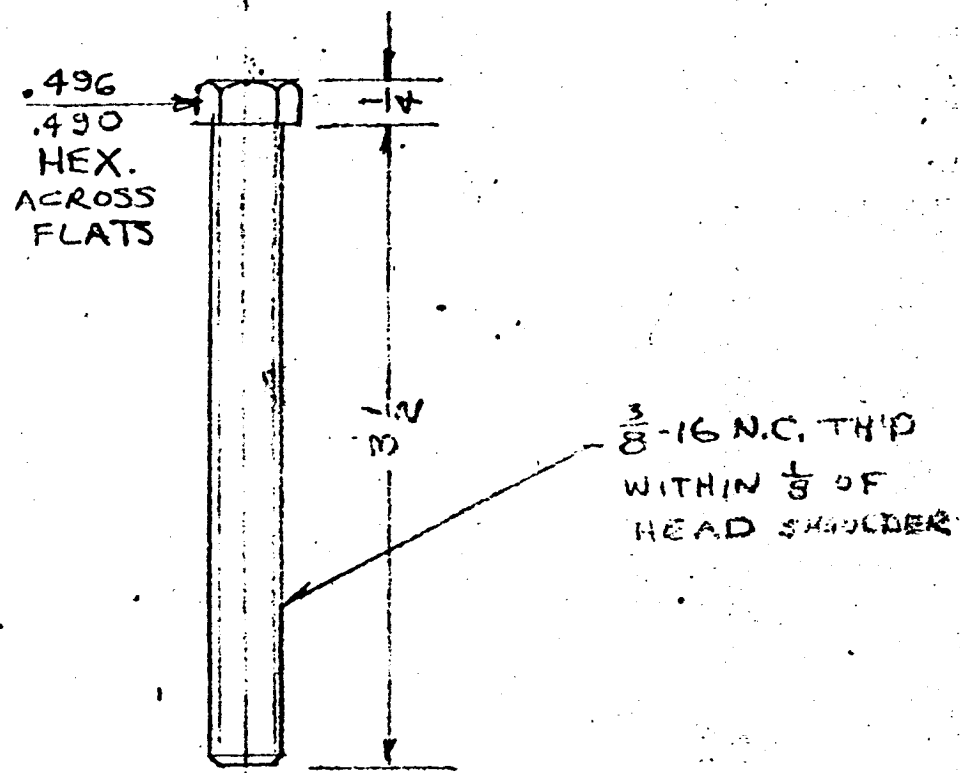
LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

BY A DATE 1 MAR 55 SUBJECT LEVELING
CHKD. BY _____ DATE _____ SCREW

SHEET NO. _____ OF _____
JOB NO. 11374-75

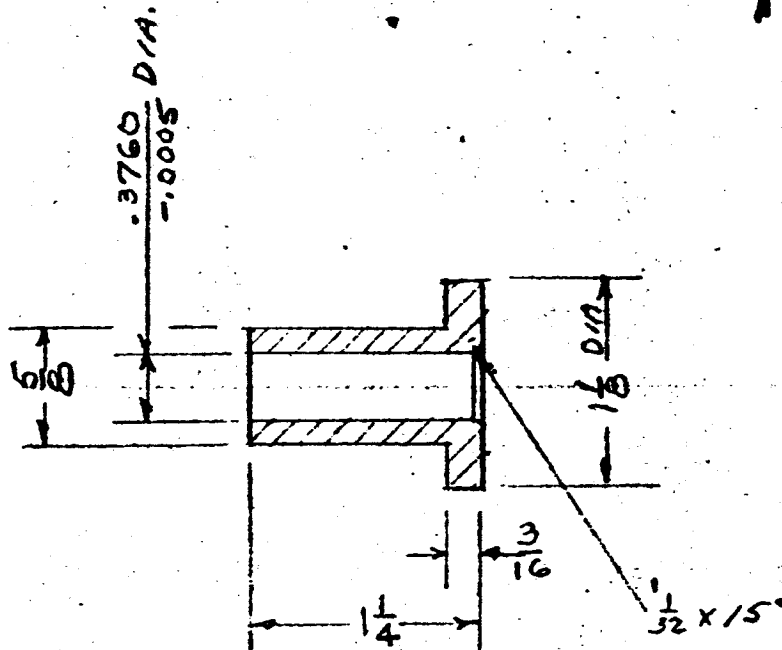
FINISH & PENETRATE.



THE BLACK & DECKER MFG. CO., TOWSON, MD.

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L:- C.R.S.

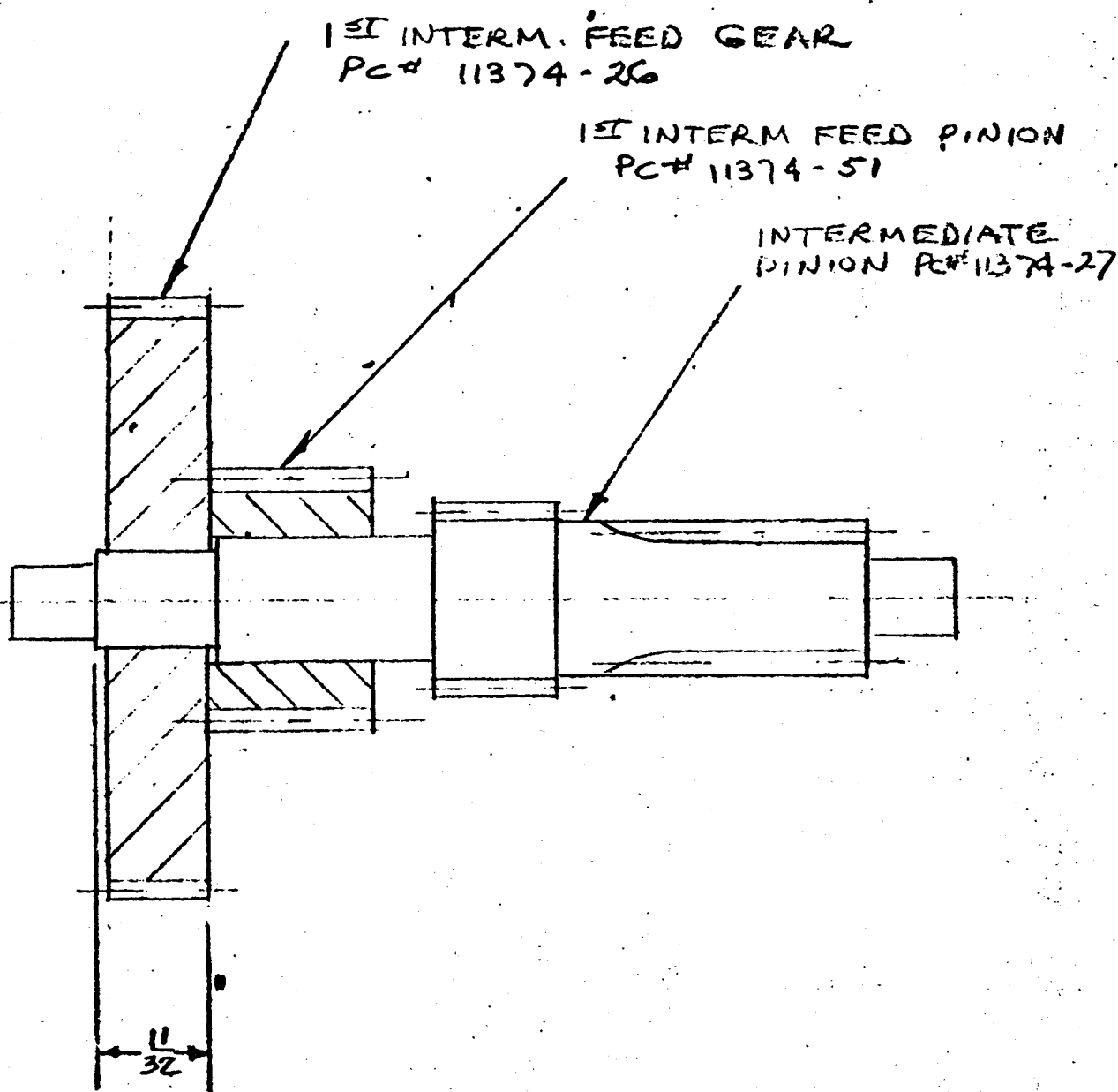


BY AS
APR

DATE 14 JUNE 75
DATE

TITLE REINFORCING BUSHING
11374-76

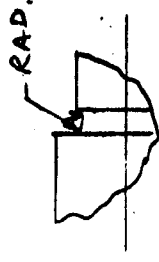
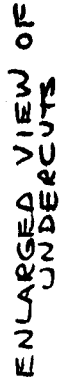
ENGINEER'S SKETCH SHEET - FORM 2118



BY <i>AS</i>	DATE 10 JUNE 67	TITLE 1 ST INTERM. SHAFT ASSY	KING 11374-77
APR	DATE		

NO. 11374-78

NORMALIZE	
ANNEAL	
CARBURIZE	
CYANIDE	.006 -.010
COOL IN	
HEAT AT	
QUENCH IN	oil
REHEAT AT	
QUENCH IN	
DRAW AT	350°F MIN
ROCKWELL	15N89 MIN
MET. APP'D.	
NOTE	



TOOTH PROFILE	
PINION	GEAR
BASE RADIUS	BASE RADIUS
54 48 42 36 30 24 18 12 6 54 48 42 36 30 24 18 12 6	54 48 42 36 30 24 18 12 6 54 48 42 36 30 24 18 12 6

GEAR DATA	BEFORE HEAT TREAT		AFTER HEAT TREAT	
	PINION	GEAR	PINION	GEAR
NUMBER OF TEETH	11		11	
NORMAL DIAMETRAL PITCH	36		36	
NORMAL PRESSURE ANGLE	20°		20°	
HELIX ANGLE	0° H.	H.	0° H	H.
STANDARD PITCH DIAMETER	.305556		.305556	
TOOTH FORM	LONG ADD.		LONG ADD.	
CALC. CIRC. TOOTH THICKNESS ON STD. PITCH CIRCLE	.050476		.05084	
AGMA QUALITY CLASS	9		8	
MASTER GEAR BASIC CIRCULAR TOOTH THICKNESS	.0436		.0436	
MASTER GEAR NUMBER OF TEETH	80		80	
TESTING PRESSURE IN OUNCES	24		24	
MAXIMUM TOTAL COMPOSITE ERROR	.0014		.0019	
MAXIMUM TOOTH TO TOOTH COMPOSITE ERROR	.0010		.0014	
TESTING RADIUS & TOLERANCE	.1618 - .001		.1623 - .0015	
MEASUREMENT OVER TWO .054 DIAMETER PINS (REF)	.3975		.3982	
LEAD	—		—	
LEAD ERROR	.0003		.0006	

HOBGING DATA			
	SINGLE	THREAD HOB	THREAD HOB
INDEX GEARS			
ACTUAL FEED			
FEED GEARS			
HOB HAND			
GEAR SHAPER DATA			
GUIDE LEAD			
CUTTER TEETH			

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

10 JUNE 1965

FRACTIONAL DIMENSION TOL. $\pm .008$ "

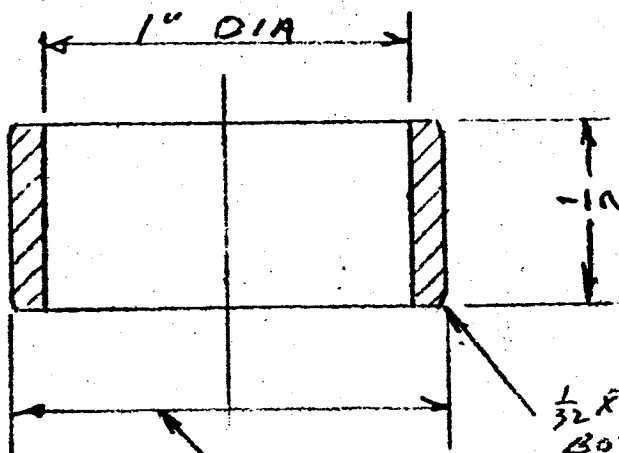
BREAK ALL SHARP EDGES & BURR

USE ON TYPE

LUNAR NASA

MAT'L: - BEARING BRONZE.

ENGINEER'S SKETCH SHEET - FORM 2118



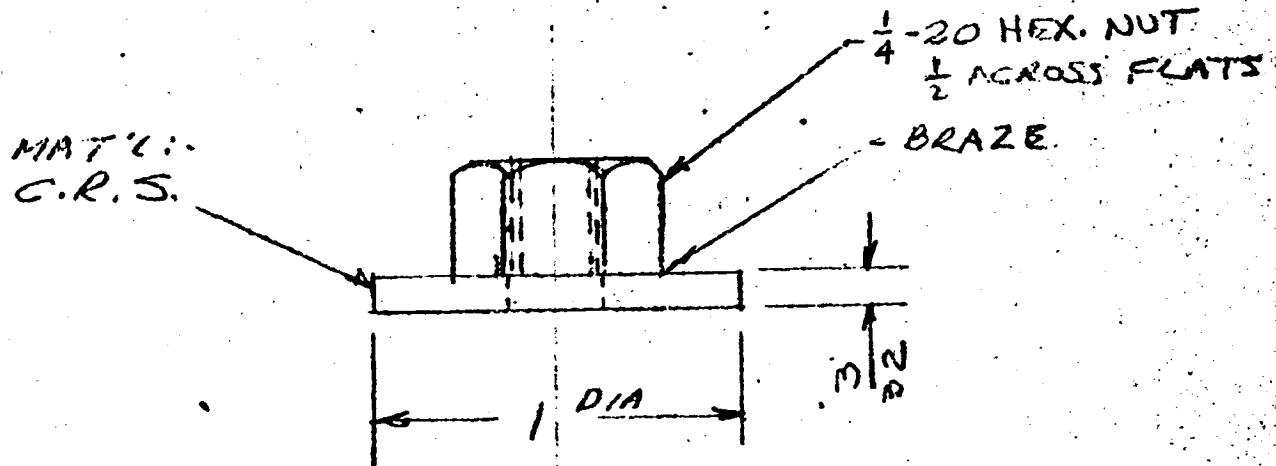
PRESS FIT IN I.D. OF
PERC. BIT SHANK REF 11374-81
(1.194 DIA. NOMINAL)

BY AS	DATE 10 JUNE 65	TITLE EXTR. BUSHING STOP	11374-79
APP	DATE		

BY AS DATE 2 MAR 65 SUBJECT ANCHORING
CHKD. BY _____ DATE _____ NUT

SHEET NO. _____ OF _____
JOB NO. 11374-80

FINISH:- PENTRATE

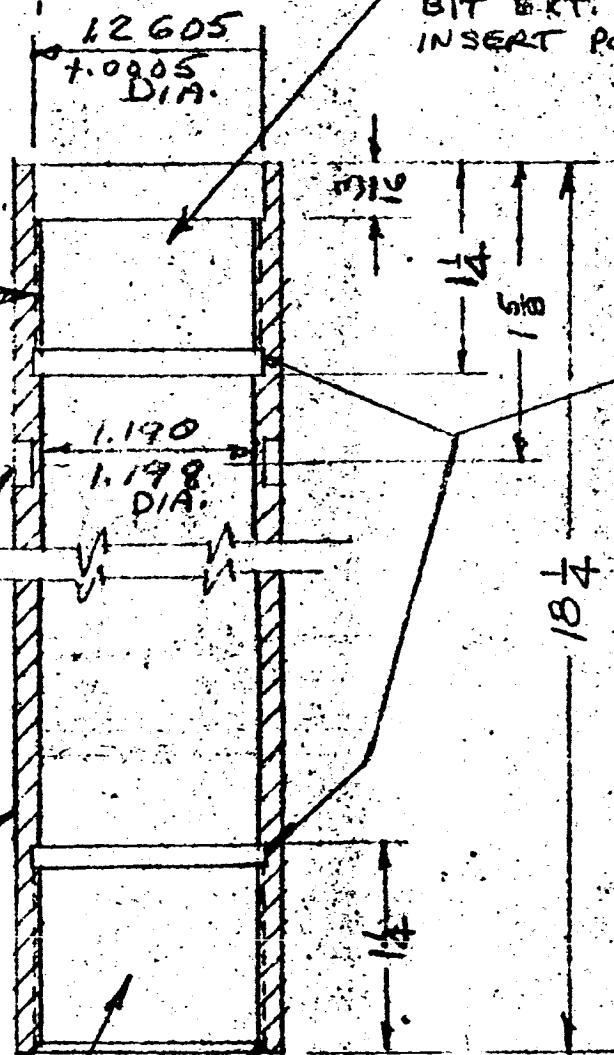


LUNAR NASA

THE BLACK & DECKER MFG. CO., TOWSON, MD.

HEAT TREATMENT
Rc 40-50

THID IN THIS END TO FIT
PERC. BIT TIP PC# 11374-133



BY A. S.	DATE 10 June 65	TITLE PERC. BIT SHANK	SECTION 11374-811
APP.	DATE		

NO. REQ'D

PATTERN NO.

MAGNET SEGMENT

11374-82

MATERIAL:---

MANUFACTURER

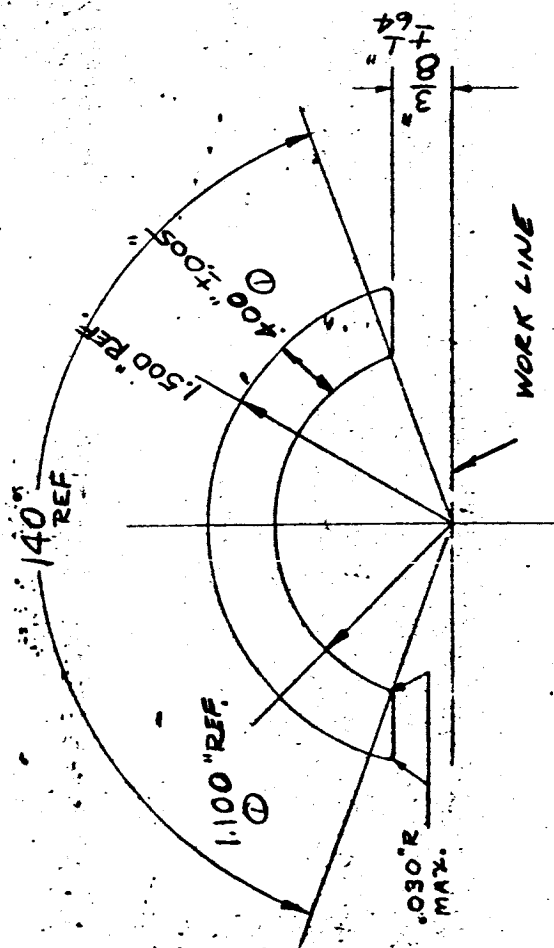
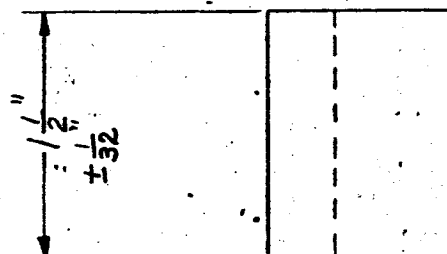
MFG NO.

MATERIAL

STACKPOLE CARBON CO.

CERAMAGNET A-9

PART MUST PASS A GAUGE HAVING AN
OPENING WITH AN OUTSIDE RADIUS OF 1.505"
AND AN INSIDE RADIUS OF 1.095" AND
STOP ON BOTH SIDES LOCATED .360"
FROM WORK LINE



DATE OF ENGINEERING CHANGES

DATE	4.24.62
DATE	6.5.62

AUSTRALIA	DATE:
CANADA	DATE:
ENGLAND	DATE:

8-16-61

DRAWN BY	DME
TRACED BY	
CHECKED BY	
BY	MM

FRACTIONAL DIMENSION 1/16" = .0625"
DECIMAL DIMENSION 1/16" = .0625"
CHECK ALL DIMENSIONS

CHECKED BY AUDIT GROUP

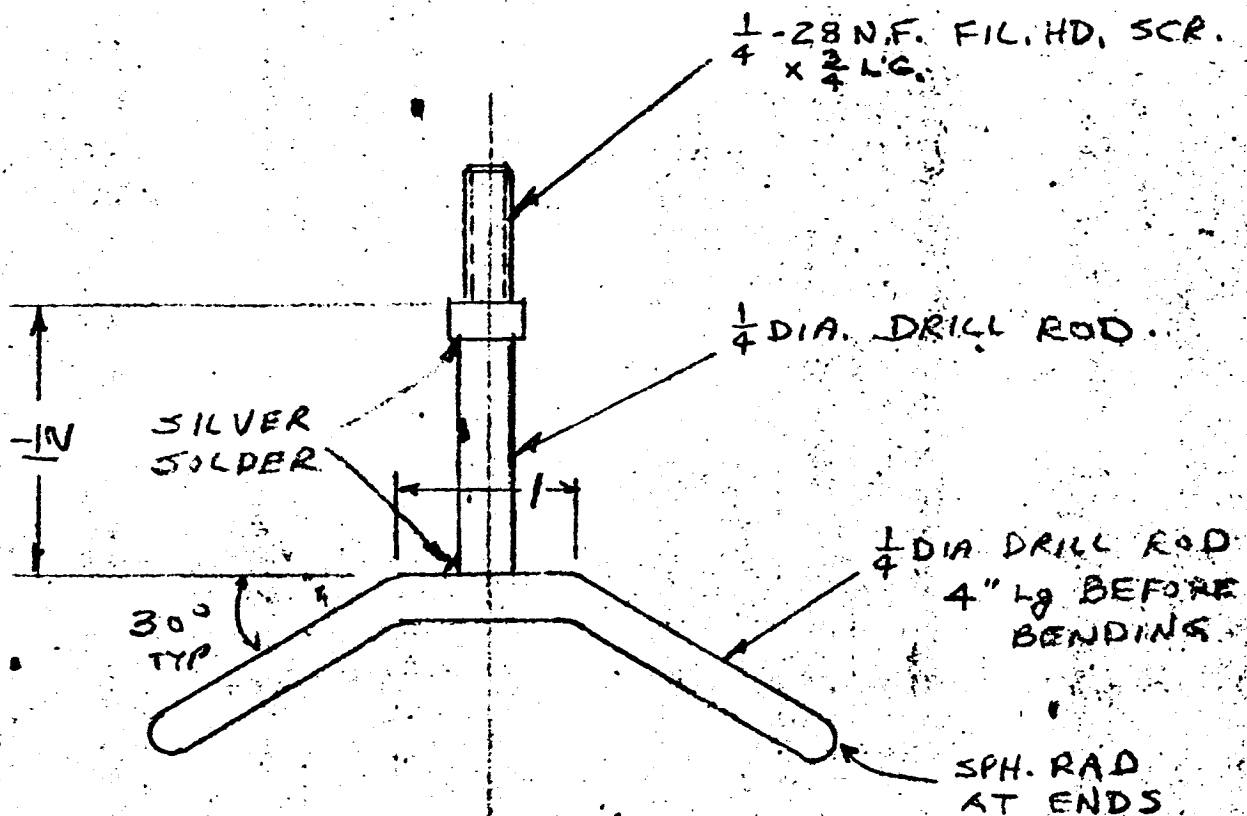
FORM 2088 1000 8-61

APR 19 1962 RWE

USE ON TYPE

THE BLACK AND DECKER MFG. CO., TOWSON, MD.

ENGINEER'S SKETCH SHEET - FORM 2118



BY AS	DATE 9 JUNE 85
APP	DATE

TITLE

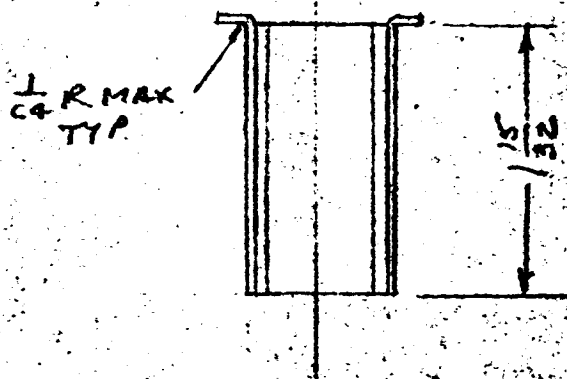
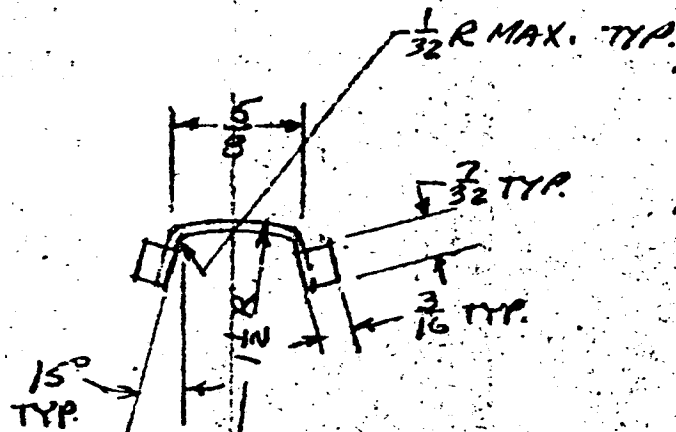
T - SCREW

DESIGN

11374-83

ENGINEER'S SKETCH SHEET - FORM 2118

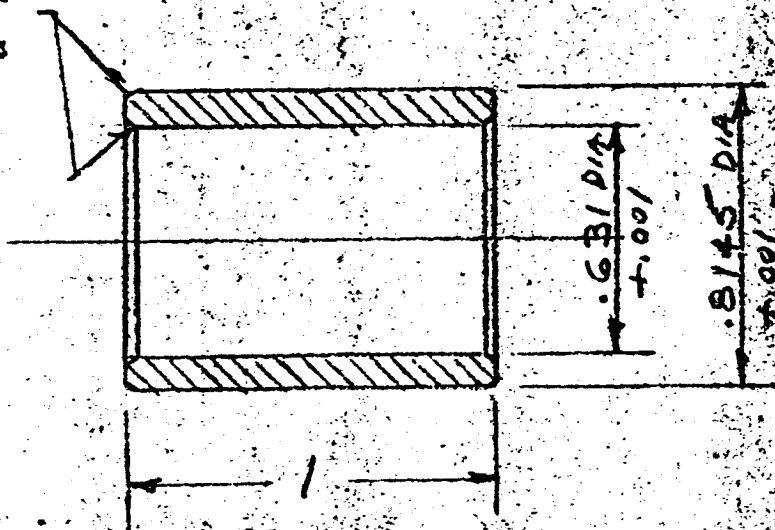
MAT'L: - $\frac{1}{32}$ TH. STAINLESS STEEL.



MAT'L: SINTERED BEARING BRONZE.

ENGINEER'S SKETCH SHEET - FORM 2118

$\frac{1}{32} \times 45^\circ$
BOTH ENDS



BY AS	DATE 9 JUNE 65	TITLE BIT EXTENSION BRG.	FILES 11374-85
APP	DATE		

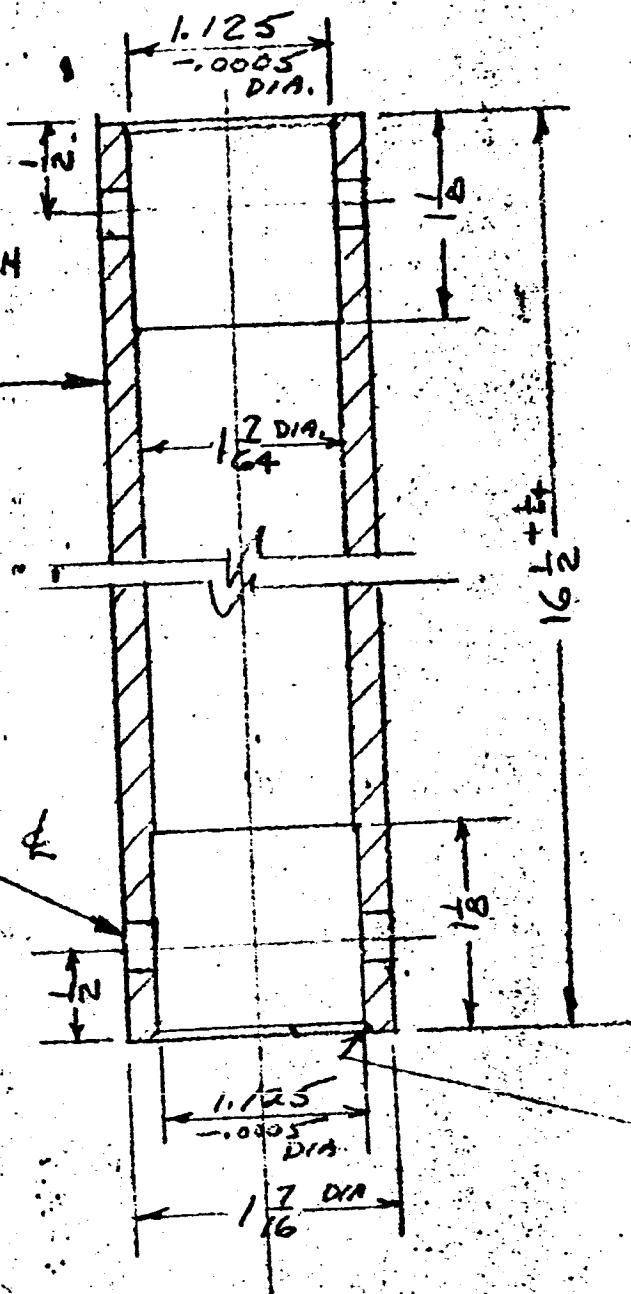
MAT'L: $1\frac{1}{2}$ O.D. $\times$ $\frac{1}{4}$ WALL 6061-T6 ALUM.
SEAMLESS TUBING.

FINISH: 6001 TO 1002 MARTIN HARDCOAT ON O.D.

ENGINEER'S SKETCH SHEET - FORM 2718

CUT SPIRALS ON
O.D. FULL LENGTH
DEPTH $\frac{1}{2}$
GROOVE
WIDTH $\frac{3}{16}$
LEAD $2\frac{5}{8}$
NO. OF
SPIRALS
EQUALLY
SPACED 7

$\frac{1}{4}$ DIA. DR. THRU &
2-HOLES



$\frac{1}{2} \times 45^\circ$ BOTH
ENDS

BY AS
APR

DATE 9 JUNE '65
DATE

TITLE

BIT EXTENSION TUBING

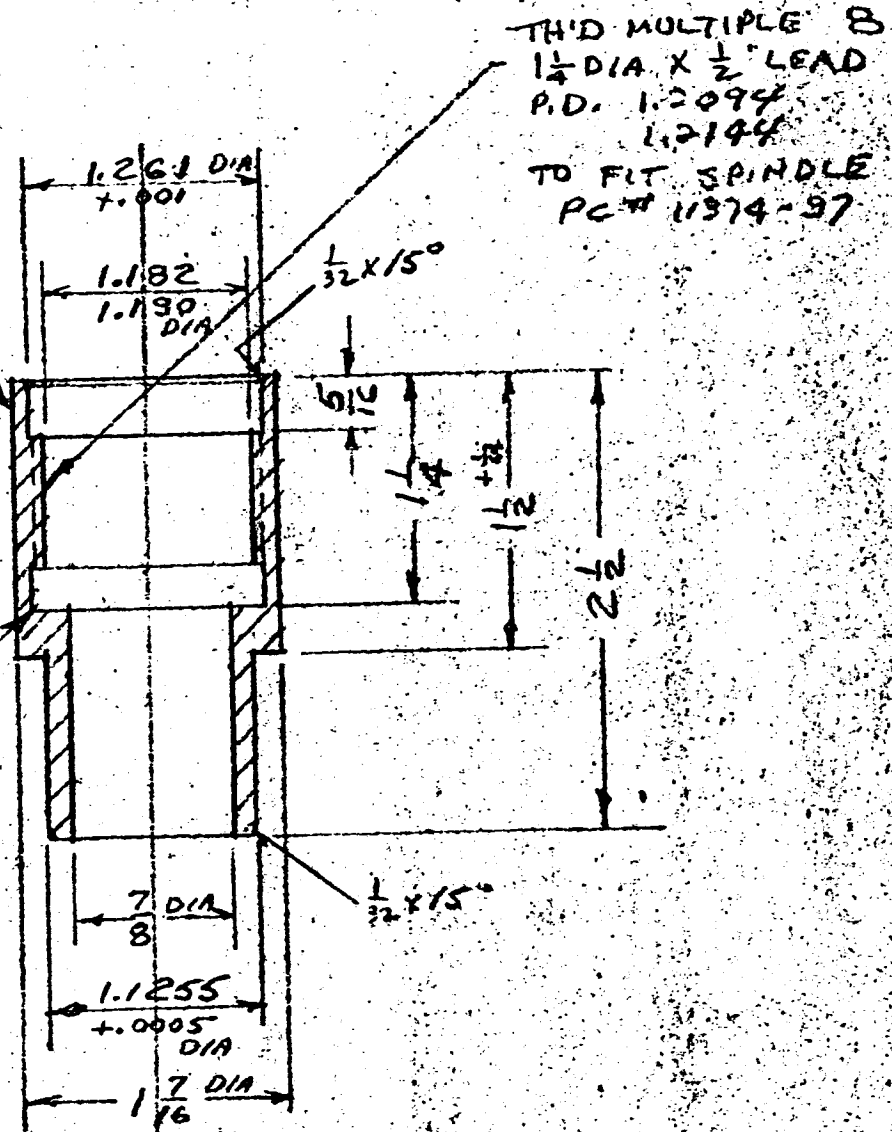
11374-B6

MAT'L: ETD 180 STEEL

ENGINEER'S SKETCH SHEET - FORM 2118

CUT SPIRALS ON O.D.
DEPTH $\frac{1}{16}$
GROOVE WIDTH $\frac{3}{16}$
LEAD $2 \frac{5}{8}$
NO. OF SPIRALS EQUALLY SPACED 7

UNDERCUT $\frac{1}{4} W$
X $1 \frac{1}{16}$ DIA.



NAT'L - ETD 180 STEEL.

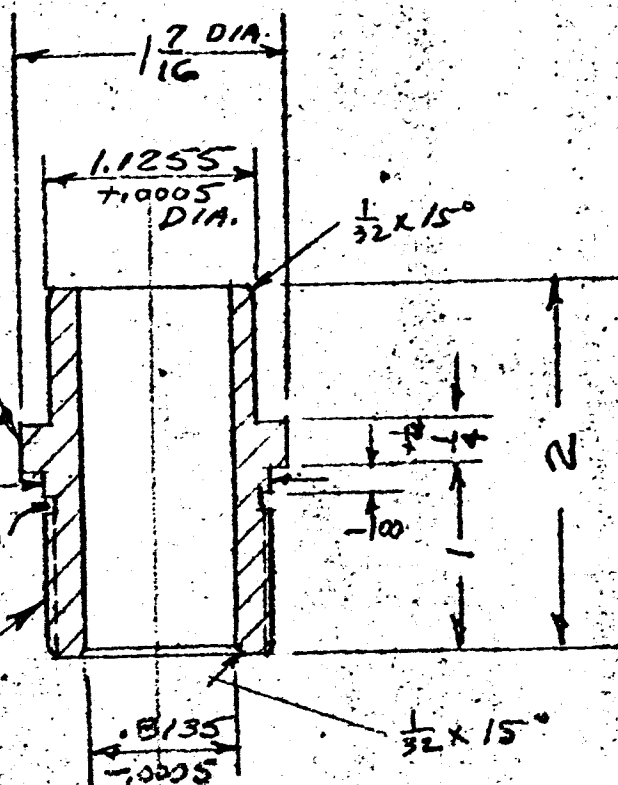
ENGINEER'S SKETCH SHEET - FORM 2118

CUT SPIRALS ON O.D.
DEPTH $\frac{1}{2}$
GROOVE
WIDTH $\frac{3}{16}$
LEAD $2\frac{3}{8}$
NO. OF
SPIRALS 7
(EQUALLY SPACED)

1.260 DIA.
- .001
UNDERCUT $\frac{3}{16}$ WX $\frac{1}{16}$ DIA.

TH'D MULTIPLE 8/
1 1/4 DIA X 1/2 LEAD
P.D. 1.2094
1.2056

TO FIT IN SPINDLE
EXTENSION PC# 11374-112
& UPPER INSERT
PC# 11374-87



BY *A-S*
APP.

DATE
DATE

9 JUN 68

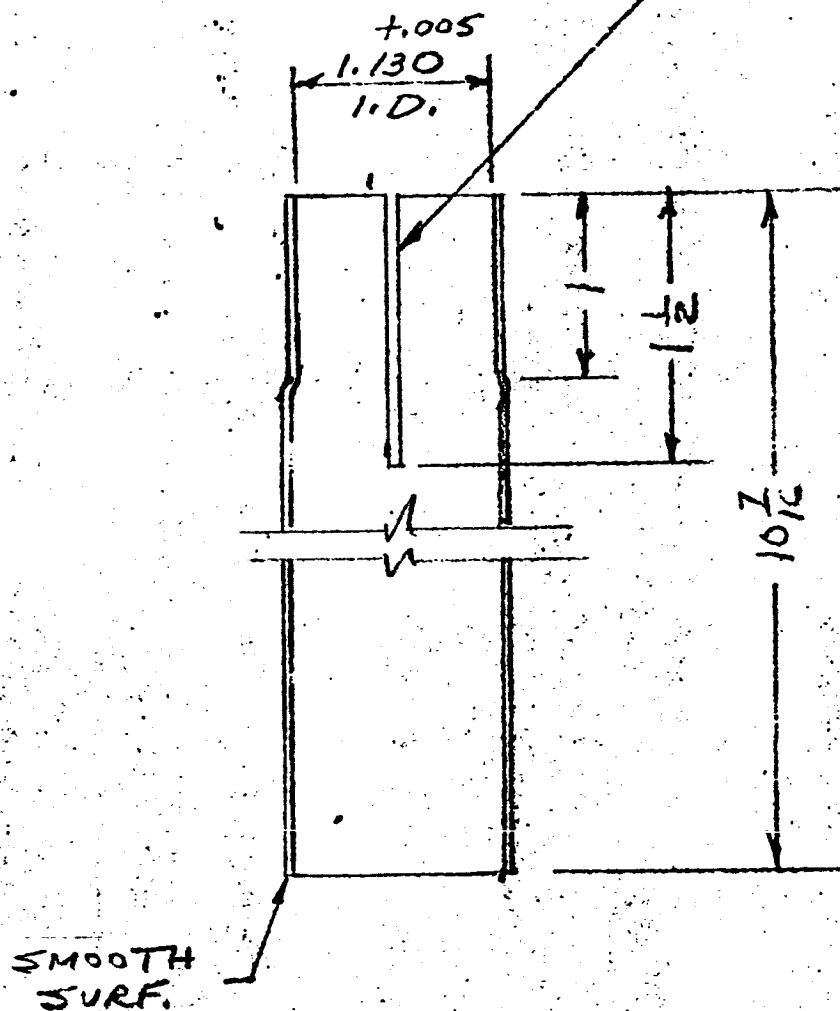
TITLE

BIT EXT. LOWER INSERT

11374-88

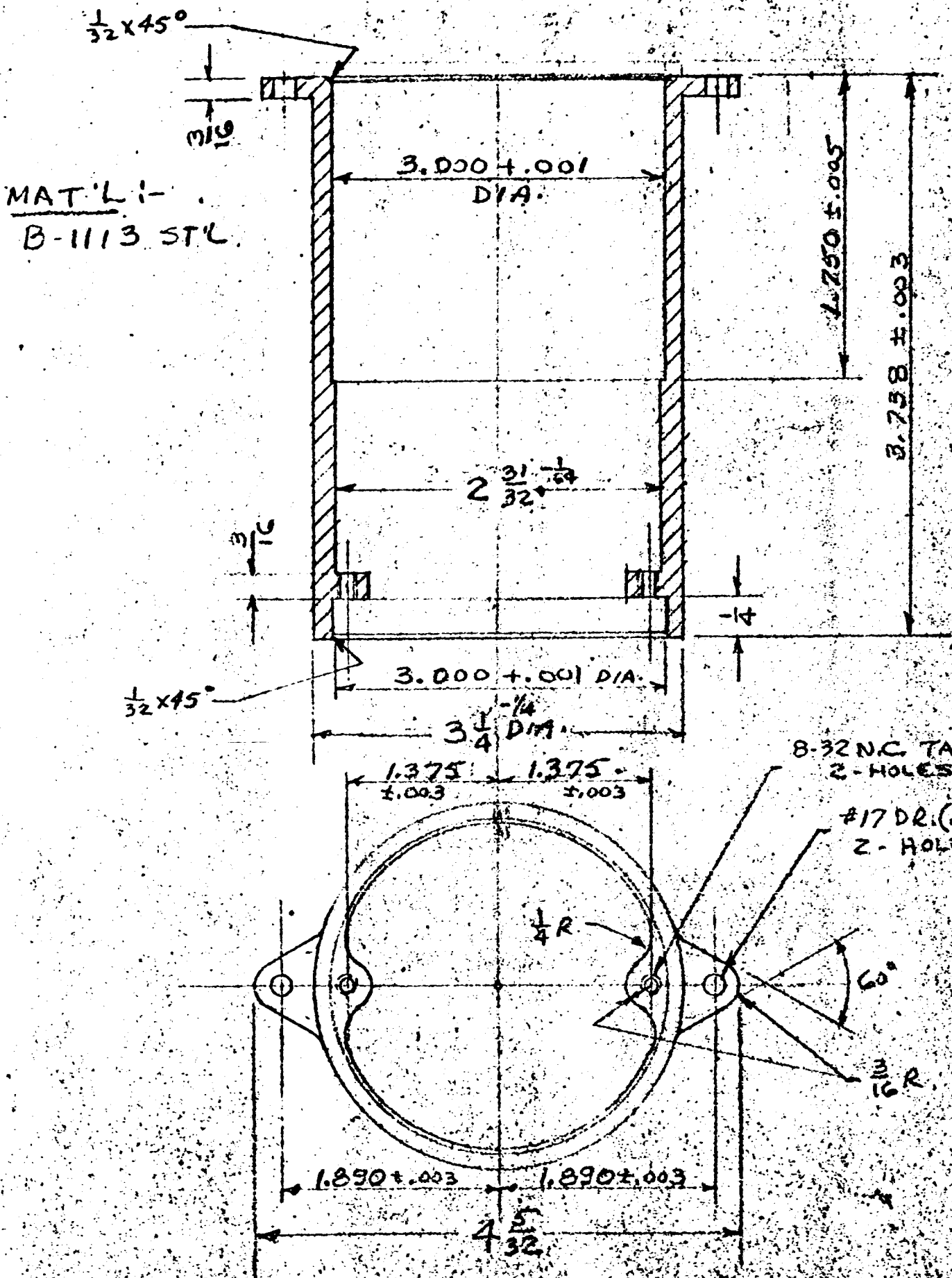
MAT'L - STAINLESS STEEL SEAMLESS TUBING
1 1/4" O.D. X .035 WALL.

C-SLOTS 3/32" WIDE
EQUALLY SPACED
REMOVE BURRS
INSIDE & OUTSIDE



BY AS DATE 11 MAR '65 SUBJECT MAGNET
CHKD. BY _____ DATE _____ HOUSING

SHEET NO. _____ OF _____
JOB NO. 11374-90

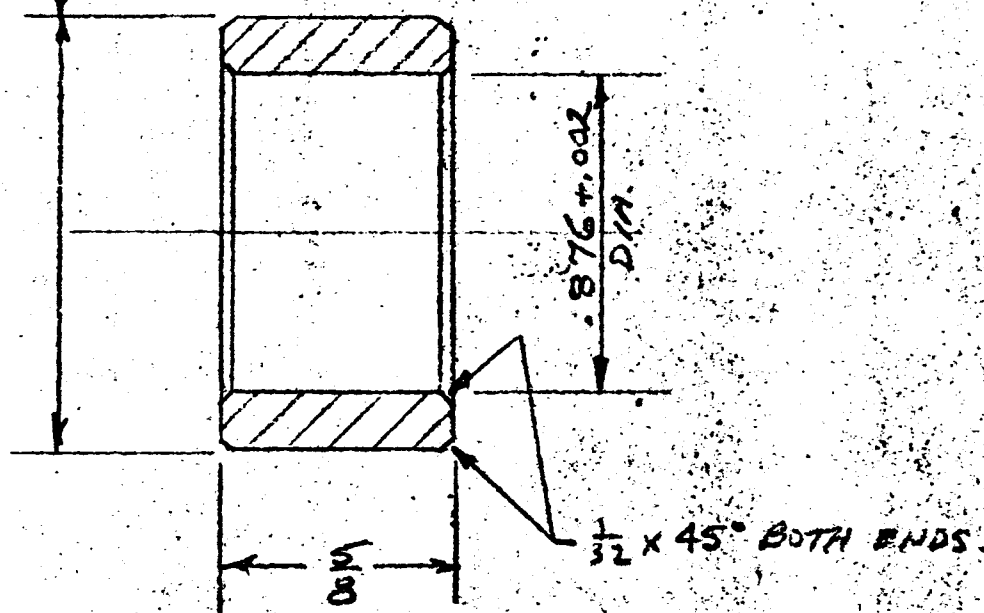


THE BLACK & DECKER MFG. CO., TOWSON, MD.

MAT'L :- C.R.S.

ENGINEER'S SKETCH SHEET - FORM 2/18

PRESS FIT IN TUBING (LARGE END)
OF PC# 11374-89
(1.180 DIA. NOMINAL)



BY AS	DATE 8 JUN 65
APR	DATE

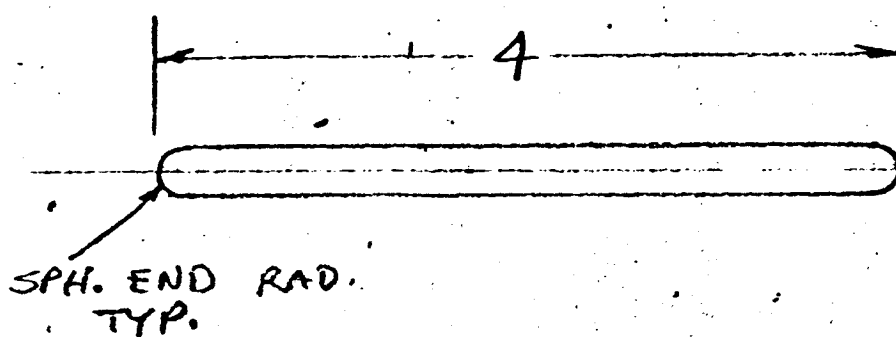
TITLE

INSERT

11374-91

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: .250 DIA. DRILL ROD.



BY AS
APR

DATE 8 JUNE 65
DATE

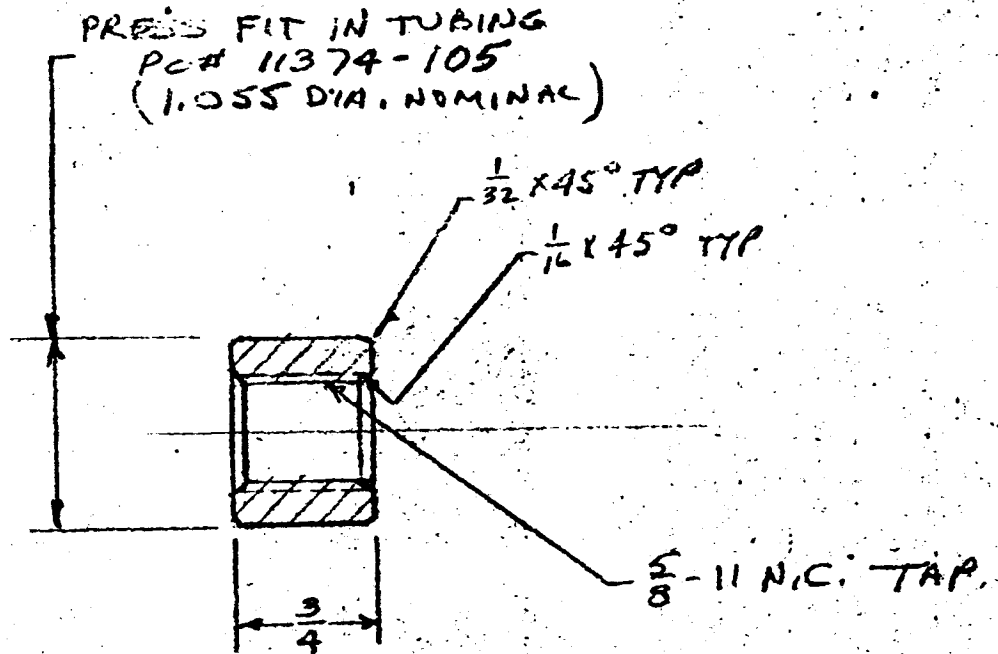
TITLE

HANDLE

11374-42

MAT'L: C.R.S.

ENGINEER'S SKETCH SHEET - FORM 2118



BY A S
APR

DATE
DATE

8 JUNE '65

TITLE

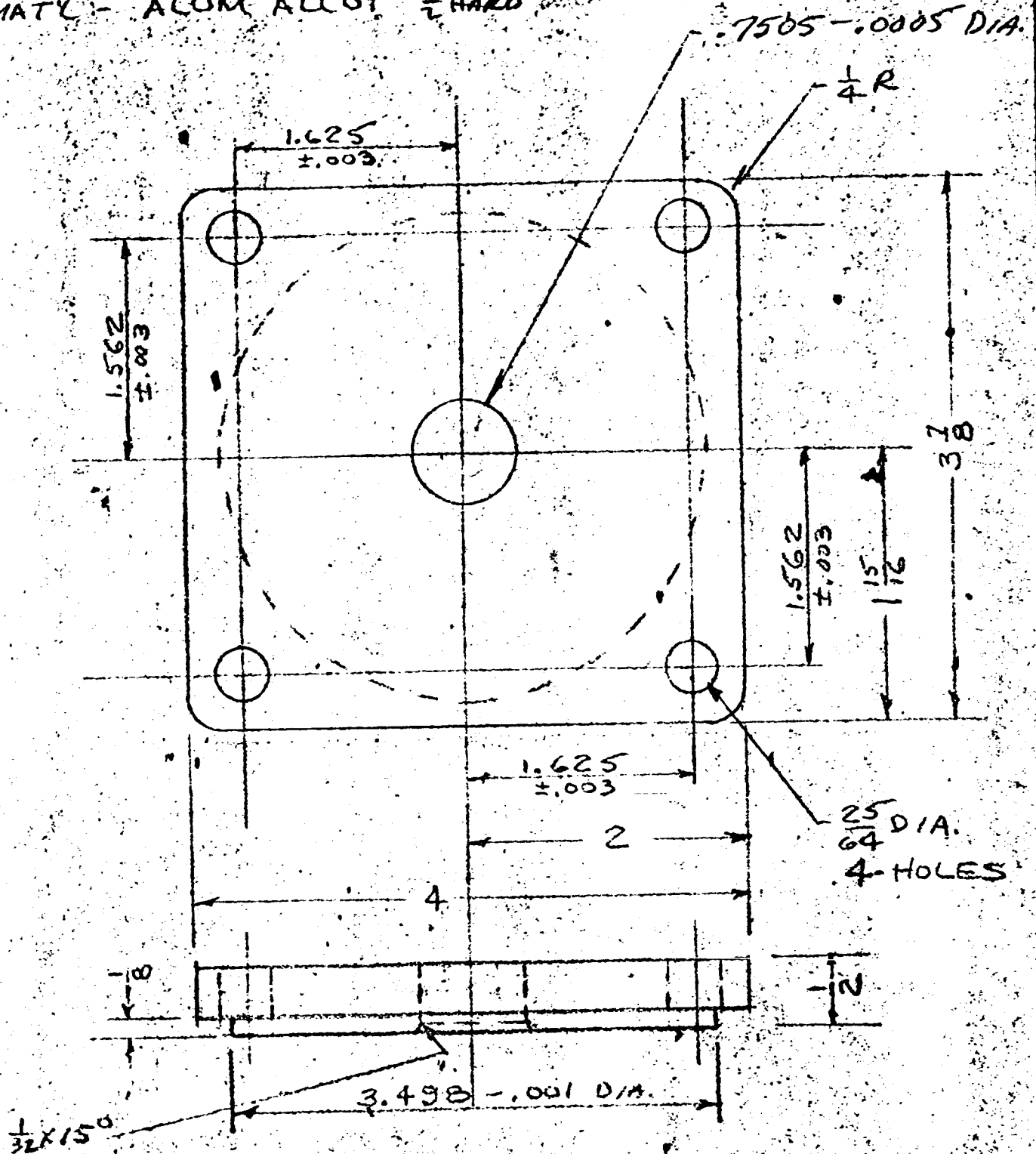
TUBING INSERT

FORM

11374-93

ENGINEER'S SKETCH SHEET - FORM 2118

MATL - ALUM ALLOY $\frac{1}{2}$ HARD



BY AS	DATE 16 MAR '65
APR	DATE

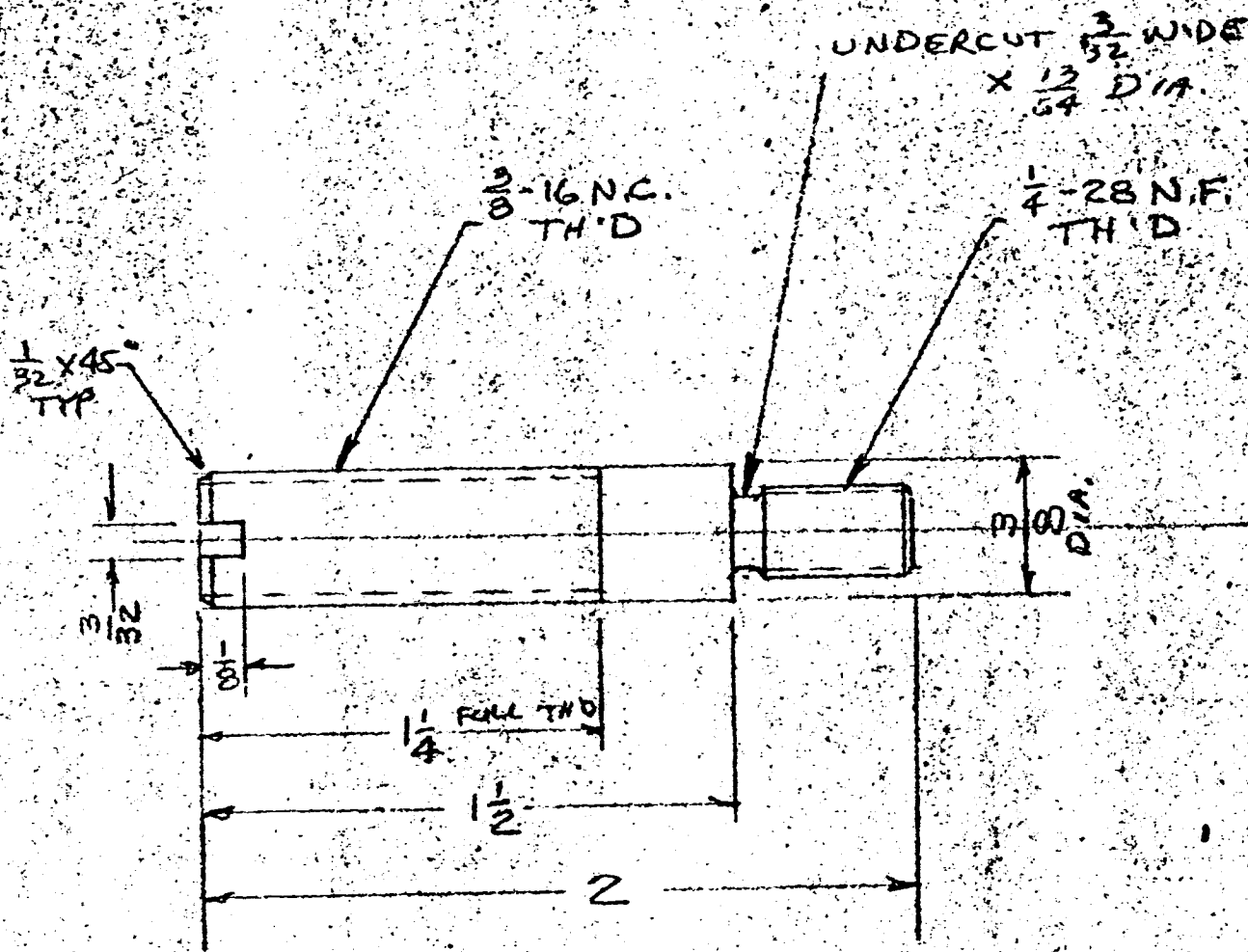
TITLE

COVER

SKETCH 11374-95

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: - C.R.S.



BY A.S.
APR

DATE 16 MAR '65
DATE

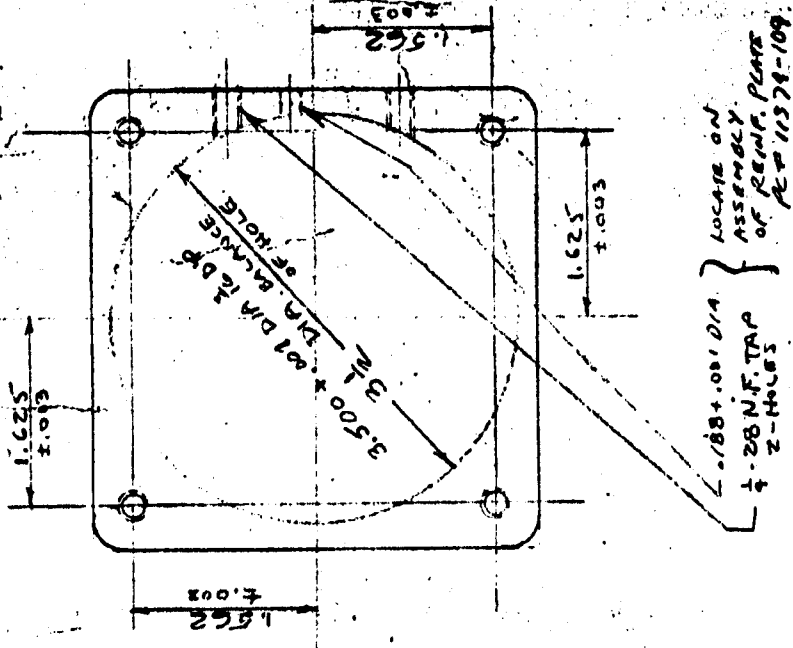
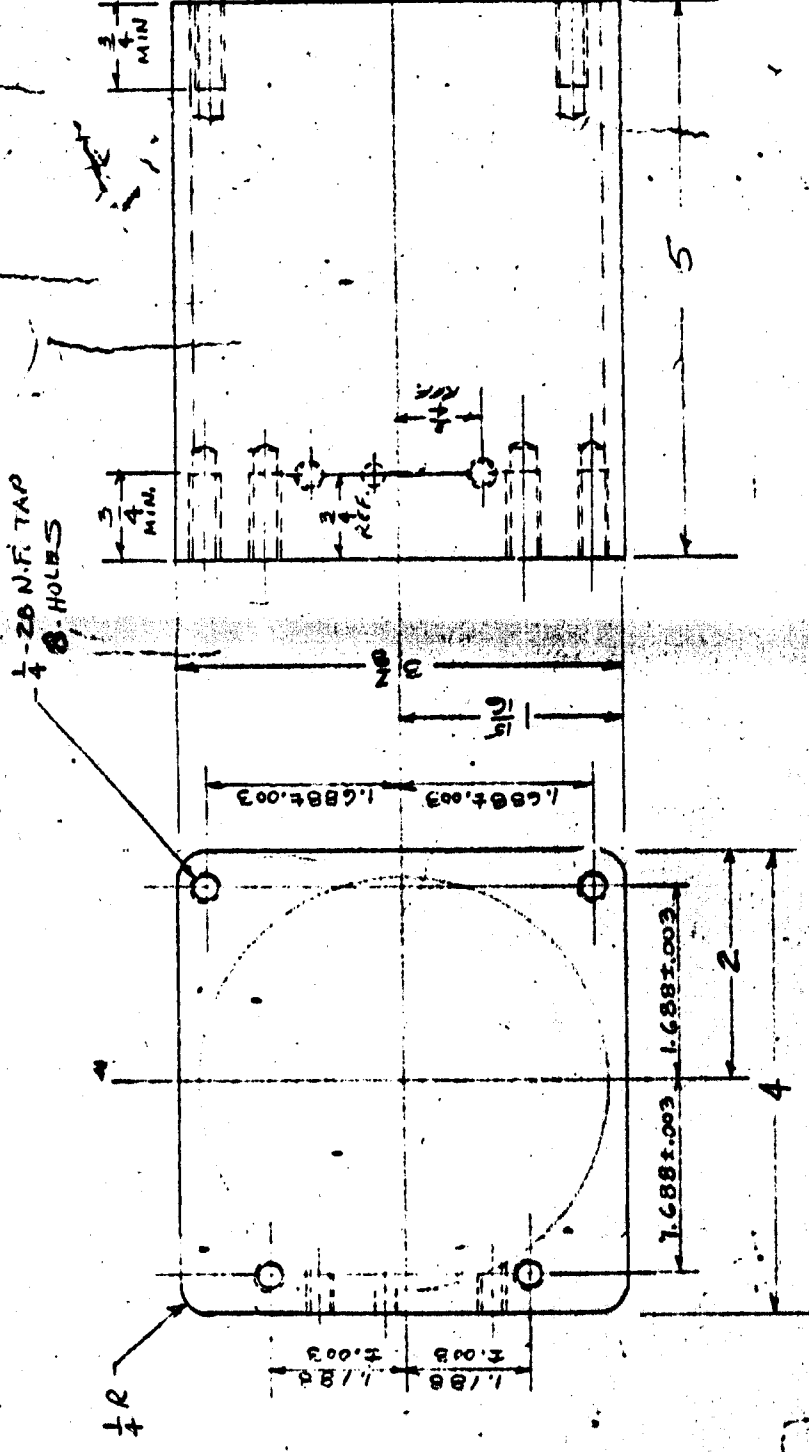
TITLE COVER RET. STUD

SKETCH 11374-96

PERCUSSION HOUSING

11374-94

MAT'L: ALUM ALLOY 1/2 HARD



16M265 AS

LUNAR NASA

DRILL BIT SPINDLE

11374-97

MAT'L: ETD 150 STEEL

2-HOLES EQUALLY SPACED
1/4 DIA. X 3/16 D.P.

UNDERCUT 3/16 W.
X 1/32 DIA.

UNDERCUT 3/16 W.
X 1/32 DIA.

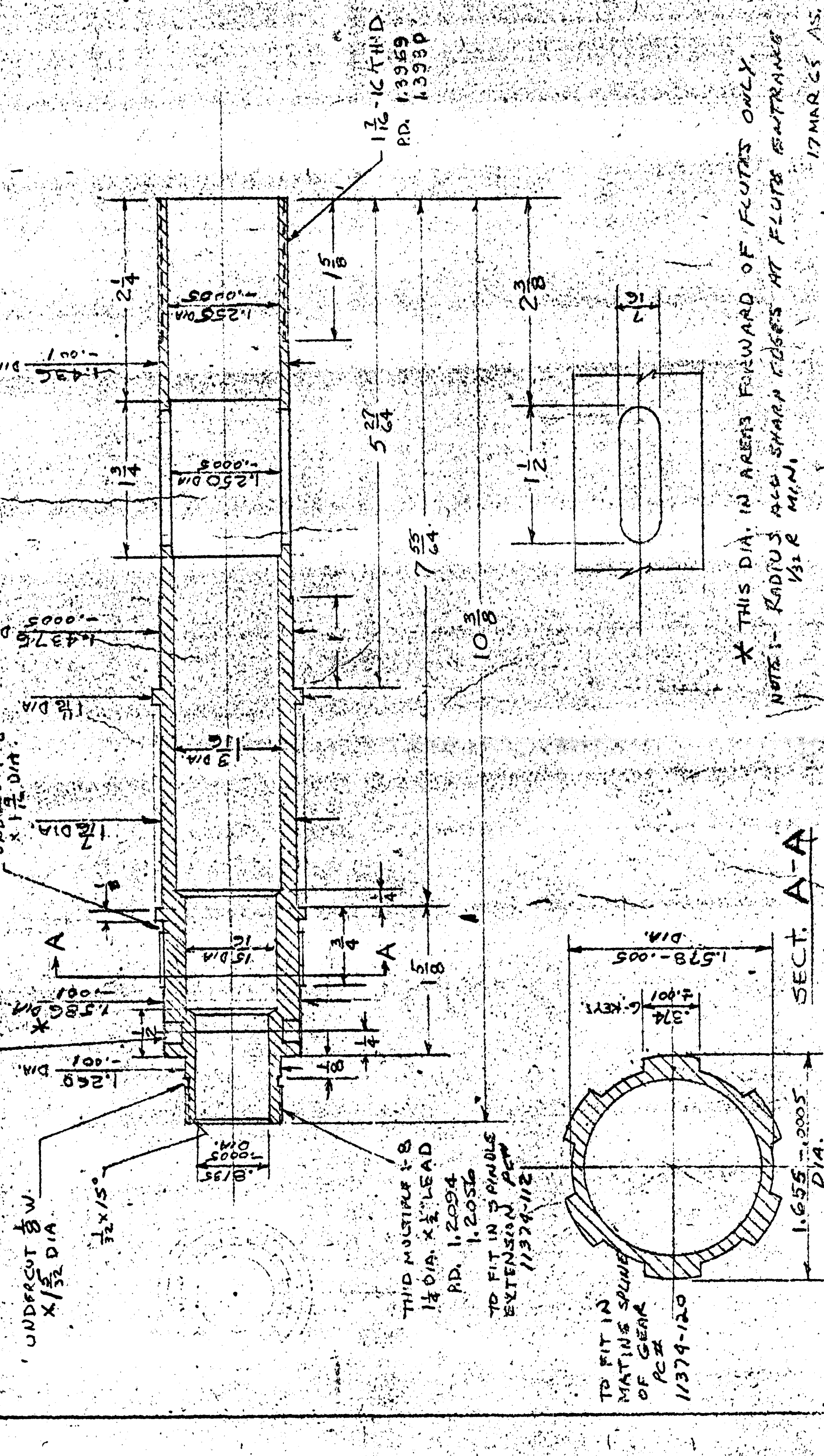
UNDERCUT 3/16 W.
X 1/32 DIA.

UNDERCUT 3/16 W.
X 1/32 DIA.

UNDERCUT 3/16 W.
X 1/32 DIA.

UNDERCUT 3/16 W.
X 1/32 DIA.

UNDERCUT 3/16 W.
X 1/32 DIA.



THIRD MULTIPLE 1-8
1 1/4 DIA. X 1/2 LEAD
PD. 1.2094
1.2056
TO FIT IN SPINDLE
EXTENSION PER
11374-112

TO FIT IN
MATING SPINE
OF GEAR
PC II
11374-120

SECT. A-A

* THIS DIA. IN AREAS FORWARD OF FLUTES ONLY.
NOTE: - RADIUS AT SHARP EDGES AT FLUTE ENTRANCE
1/32 R MIN.

17 MAR 65 AS.

LUNAR NASA

THE BLACK & DECKER MFG. CO. HUNTSVILLE, ALA.

ENGINEER'S SKETCH SHEET - FORM 217B

MAT'L: - 8620 ST'L

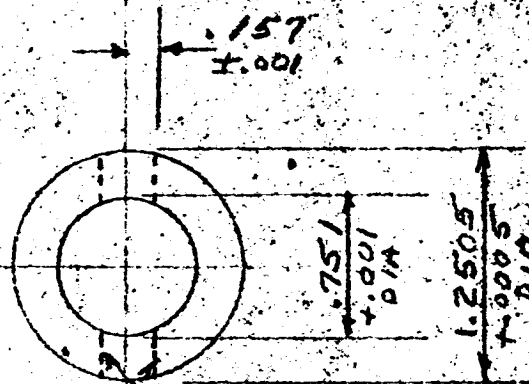
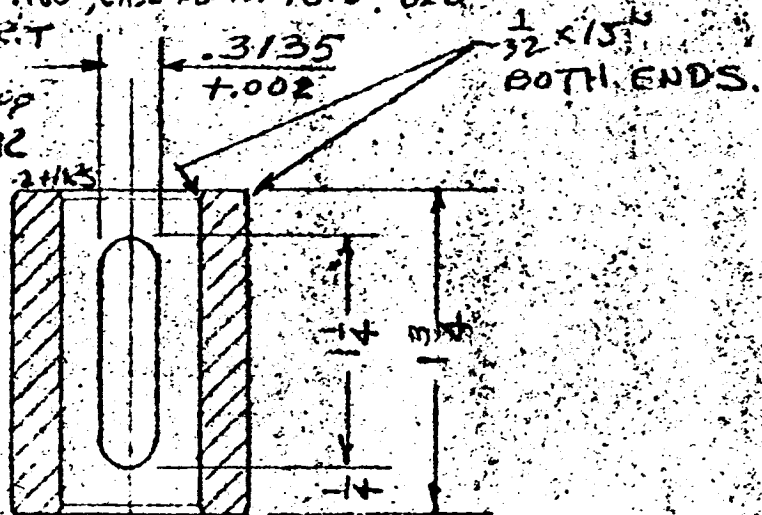
H.T.

CARBURIZE @ 1650°F
CARBON POTENTIAL .85-1.00, CASE DEPTH .015-.020
ATMOSPHERE COOL TO R.T.
REHEAT TO 1550°F
OIL QUENCH @ 120°F
TEMPER 250°F - 1 HR
REFRIGERATE @ 120°F 2 HRS
RETEMPER @ 375°F
1 HR

CASE R_{15N} 89-91.5

CORE R_c 32 min

Q&A 3/18/65



POLISH
STRAIGHT
SURFACES
OF ELONGATED
SLOTS

BY AS
APP

DATE 17 MAR '65
DATE

TITLE

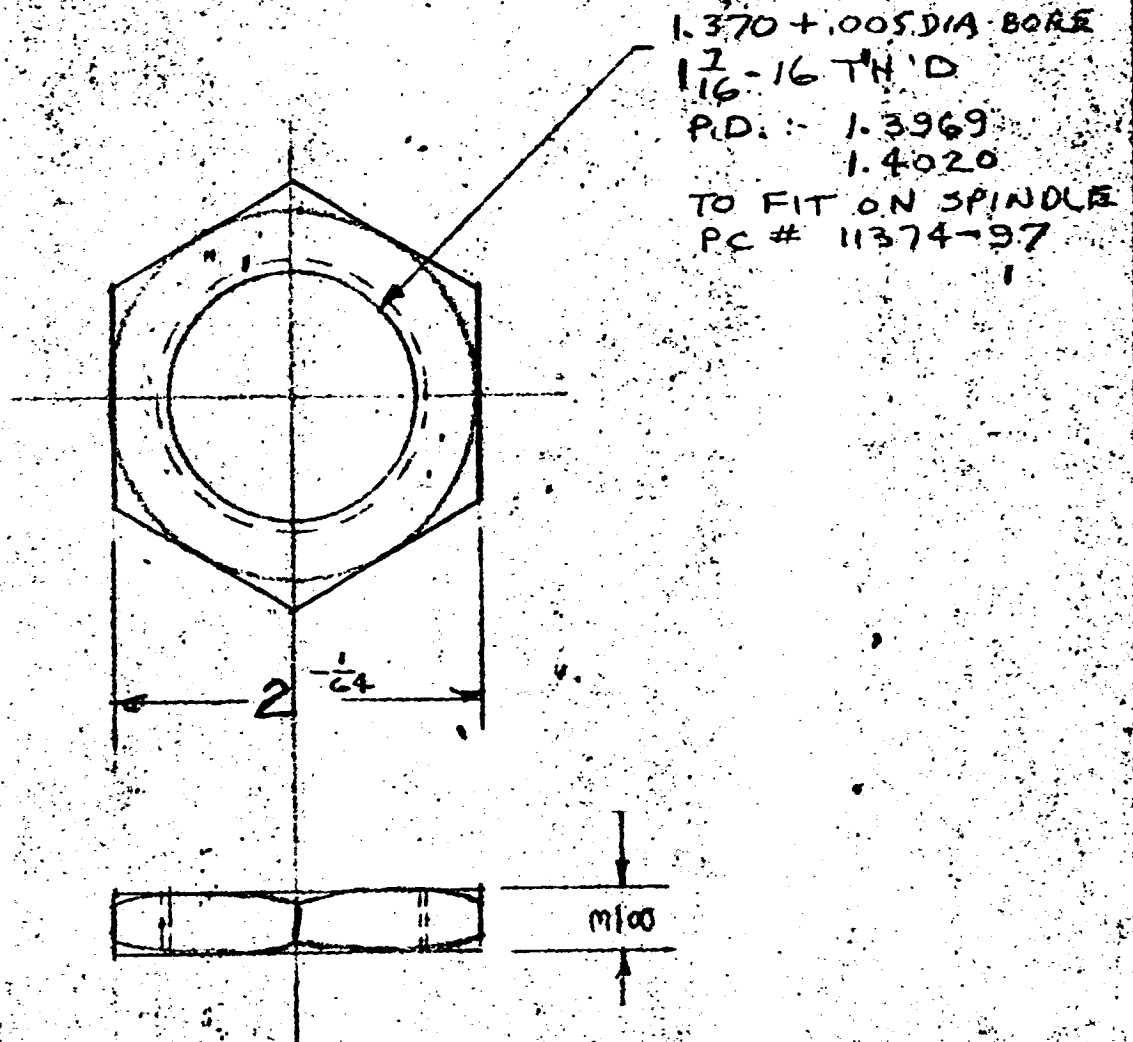
CAM DRIVE BUSHING

DESIGN

11374-98

MAT'L: C.R.S.

ENGINEER'S SKETCH SHEET - FORM 2118



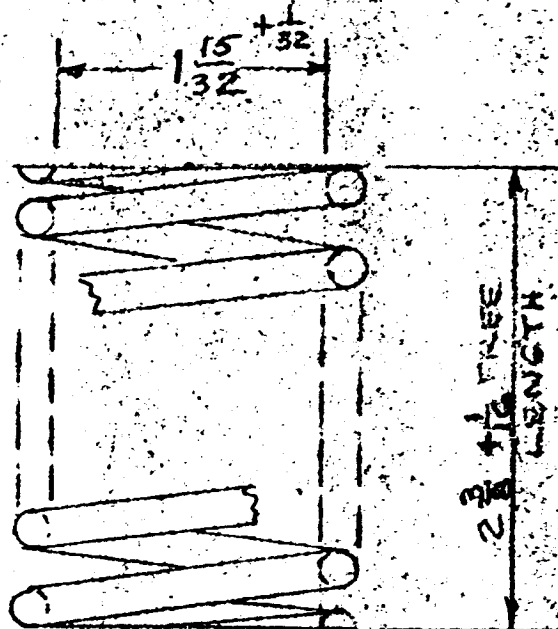
ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: .207 DIA ELGILOY STEEL WIRE

SUBMIT TO LAB FOR
CLEANING BEFORE H.T.

HEAT @ 980°F - 5 HRS

SUBMIT TO LAB FOR
FINAL CLEANING
AFTER H.T.



ACTIVE COILS : 5
TOTAL COILS : 7 (APPROX.)

SQUARED & GROUND ENDS

BY A S	DATE 17 MAR '65	TITLE PERCUSSION SPRING	FORM 11374-100
APR	DATE		

MAT'L - 4340 ST'L

A. 5.

CARBON POTENTIAL:

85-100

CASE DEPTH:

1020-1025

RAPIDLY COOL IN
CONTROLLED

ATMOSPHERE

REHEAT 1523°F

QUENCH 500°F SALT

HOLD: 40 MIN. @

COOL TO ROOM TEMP.

50 FLAT
TYPE

17 DR. 3-HOLES EQUALLY
64 SPACED ON $3.000 \pm .003$
DIA. BOLT CIRCLE.

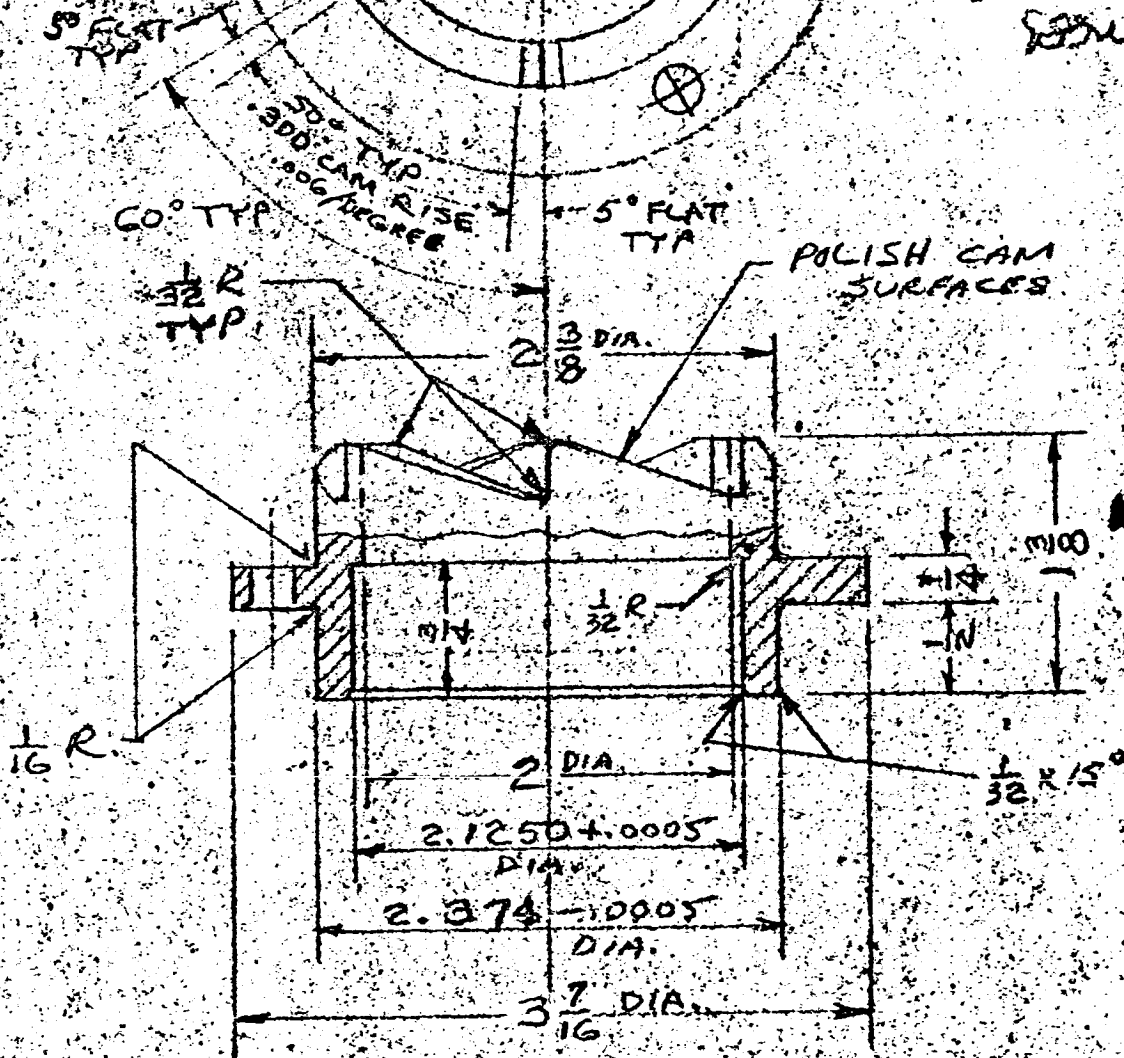
H.T. CONT'D

TEMPER 250°F 1 HR.
REFRIGERATE - 120°F
3 HRS.

RETEMPER 450°F
2 HRS

CASE RC 60-62
CORE RC 48-53

50112



BY A-S

DATE	17 MAR 65
------	-----------

FILE

STATIONARY CAM

11374-101

APP.

DATE

ENGINEER'S SKETCH SHEET - FORM 2118

H.T.

12 ATAPOS.

F T. 5° FLAT TYP

50° TYP

300 CAM RISE
.006 / DEGREE

60° TYP

5° FLAT TYP

1.437 DIA
± .001

2 DIA

2 DIA

Technical drawing of a mechanical part, likely a cam or valve component, showing dimensions and surface requirements.

Dimensions and features:

- Top surface: $\frac{1}{32} R$ (fillet radius)
- Side surface: $\frac{1}{16} R$ (fillet radius)
- Bottom surface: $\frac{1}{32} \times 45^\circ$ (fillet radius and angle)
- Bottom hole: $2.000 \pm .002$ DIA.
- Bottom hole: $.3130 \pm .0005$ DIA. THRU.
- Surface finish: POLISH CAM SURFACES
- Overall width: 6.000
- Overall height: 1.00
- Overall depth: 1.00

3

DATE _____

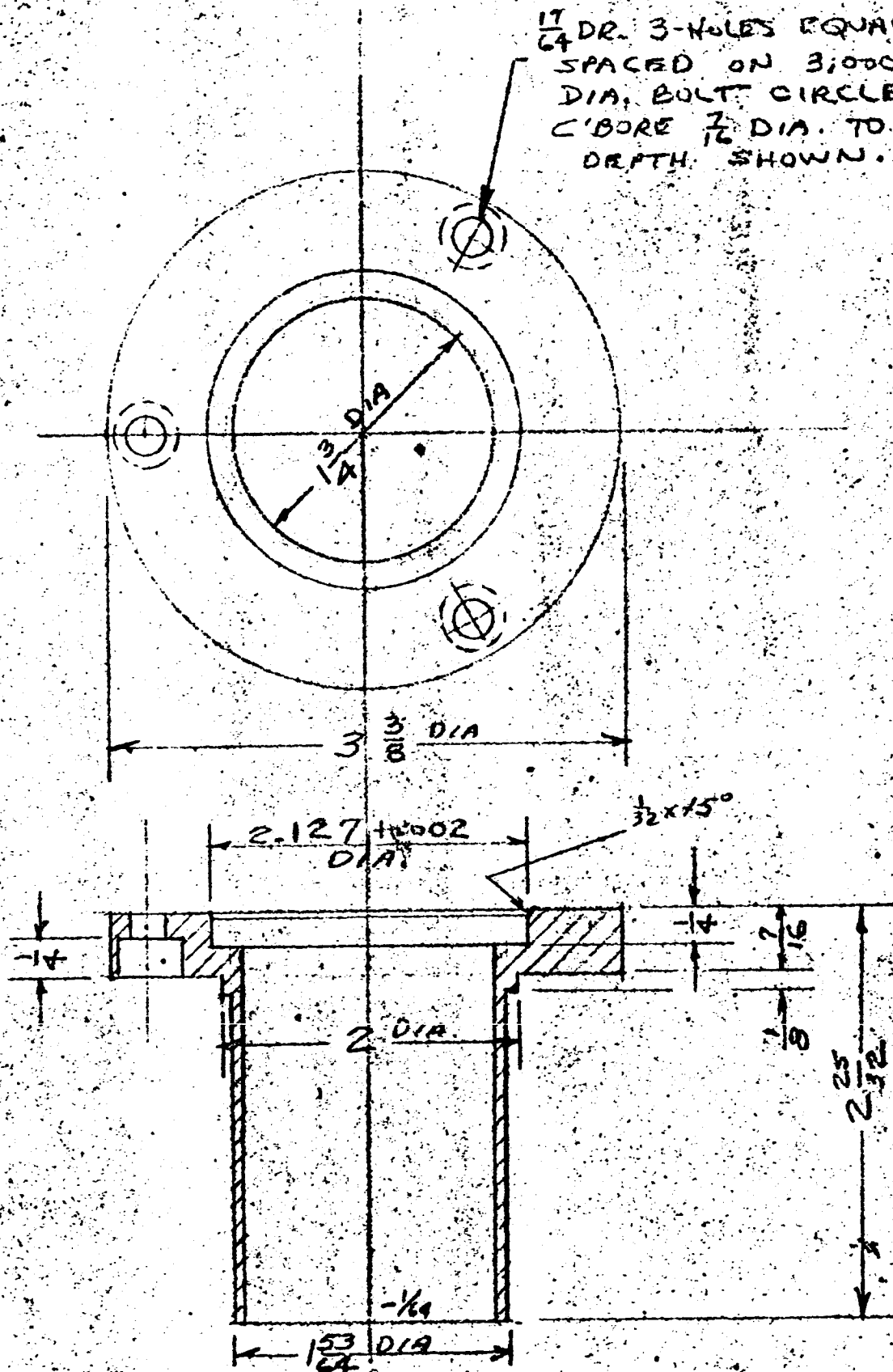
MOVING CAM

POLEYS

11374-102

MAT'L: ALUM. ALLOY 1/2 HARD

17/64 DR. 3-HOLES EQUALLY
SPACED ON 3.000 ± .003
DIA. BOLT CIRCLE.
C-BORE 7/16 DIA. TO
DEPTH SHOWN.



BY A S
APR

DATE 18 MAR '65
DATE

TITLE UPPER BRG CAP

11374-103

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: C.R.S.

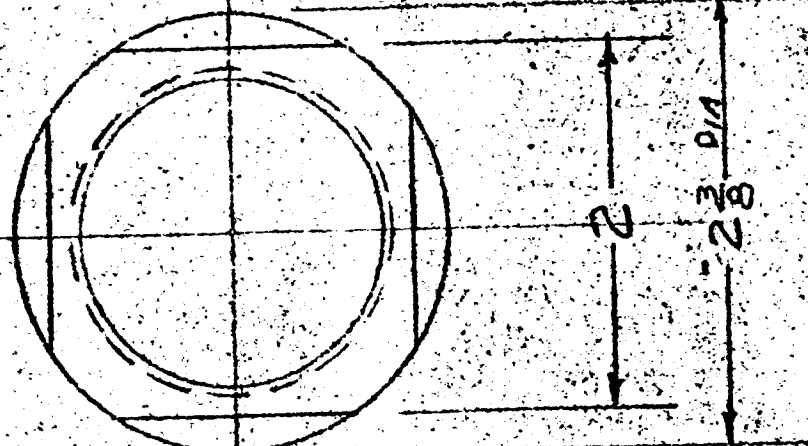
1.682 $\pm$.005 DIA
BORE

1 $\frac{3}{4}$ - 16 TH'D

P.D. 1.7094

1.7146

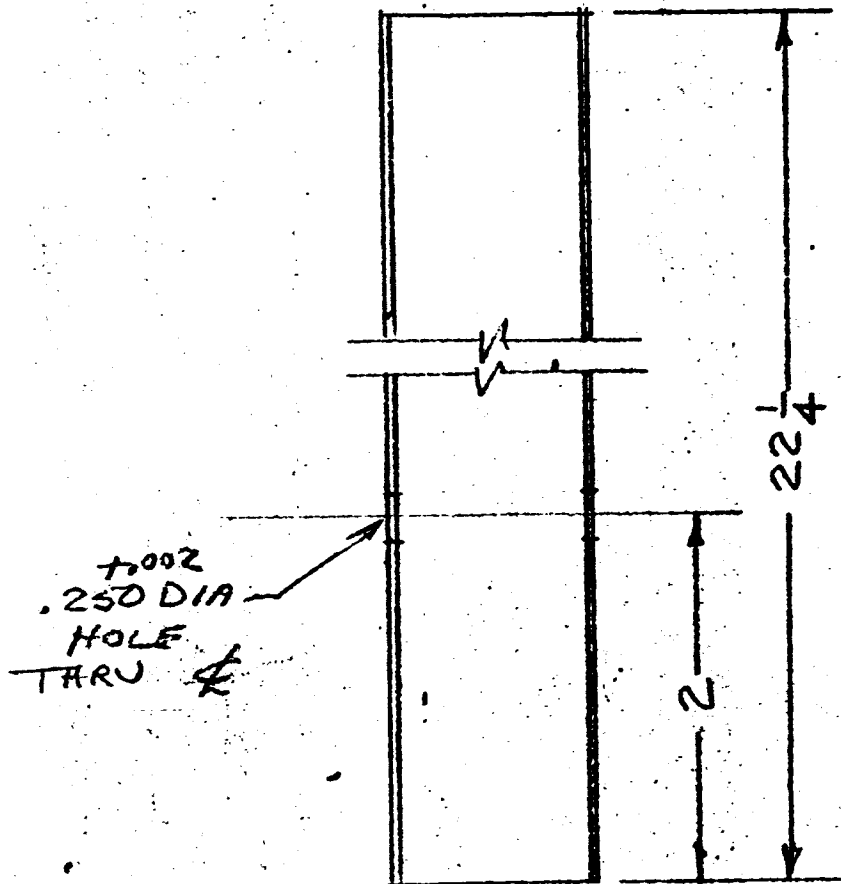
TO FIT ON GEAR
11374-92



BY AS	DATE 18 MAR 65	TITLE BEVEL GEAR NUT	11374-104
APP	DATE		

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: STAINLESS STEEL SEAMLESS TUBING,
1/8" O.D. X .035 WALL.



BY **AS** DATE **8 JUN 65**
APR DATE

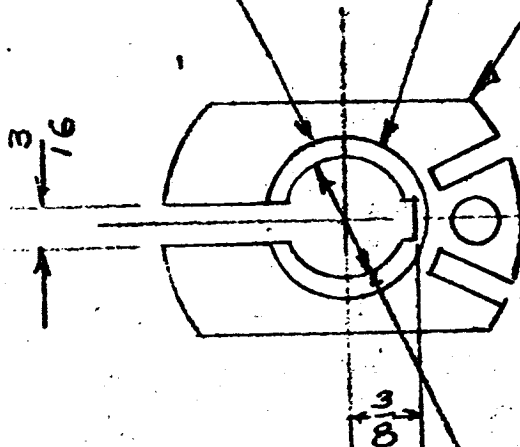
TITLE **STAB. EXT. TUBING**

11374-105

RAYBESTS-MANHATTAN INC.
RAY-BOND ADHESIVE
R-86025 KIT

SLIP CLUTCH LINING.
11374-43

SLIP CLUTCH RET.
11374-42



.625-.001 DIA.

BY A.S.	DATE 7 JUNE 65	TITLE SLIP CLUTCH ASS'Y	11374-106
APR	DATE		

ENGINEER'S SKETCH SHEET - FORM 2/18

MAT'L: 1095 ST'L

H.T.

HEAT @ 1550°F
OIL QUENCH
TEMPER @ 700°F MIN
1-HR.
RC 43-48

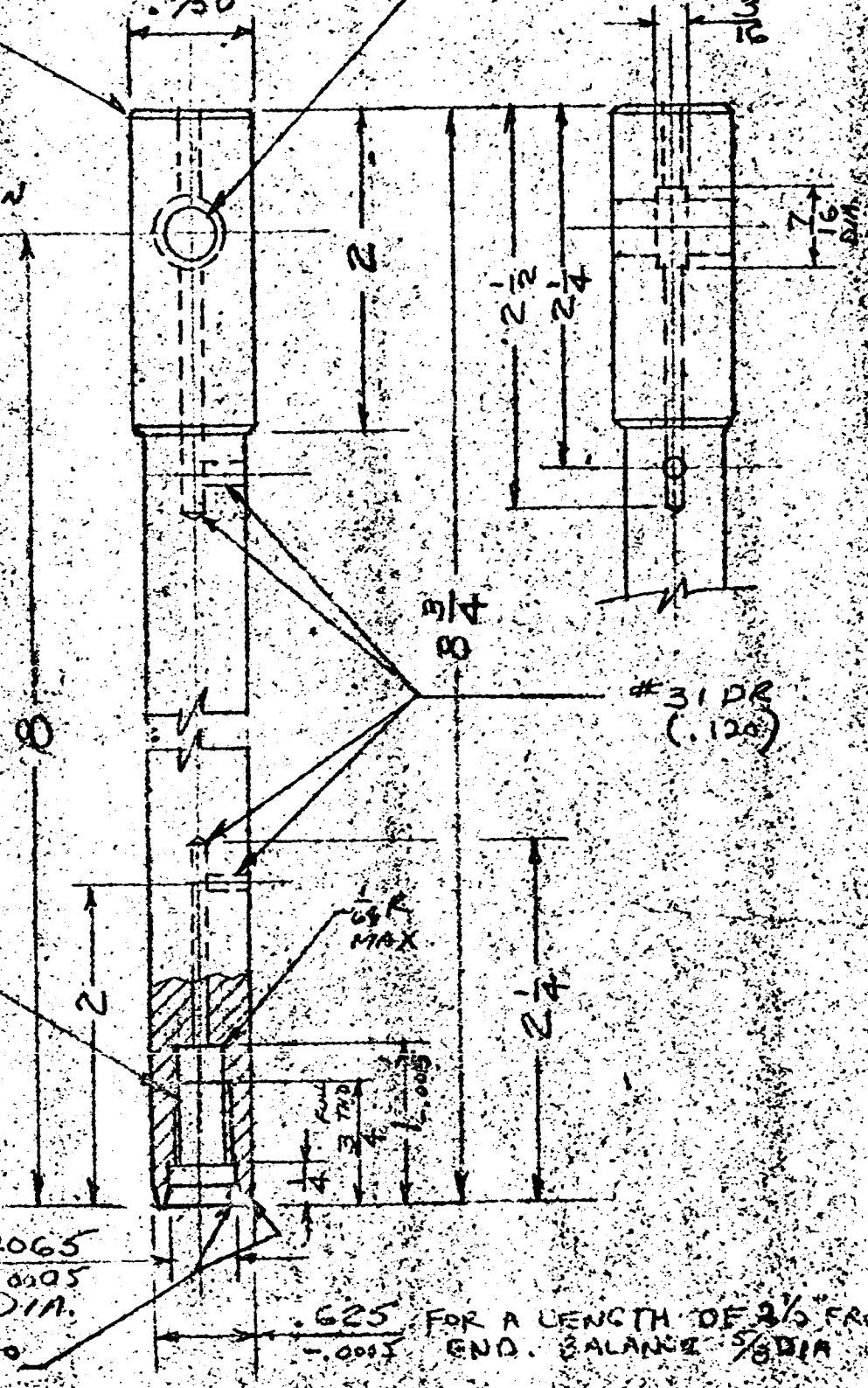
3/8 - 16 N.C.
TAP.

1/8 x 10°

.4065
+.0005
DIA.

-.0005 DIA.
.750

+.0005
3/25 DIA.



BY AS
APR

DATE 19 Mar 65
DATE

TITLE

PERCUSSION ROD

11374-107

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: C-1215 ST'L

H.T.

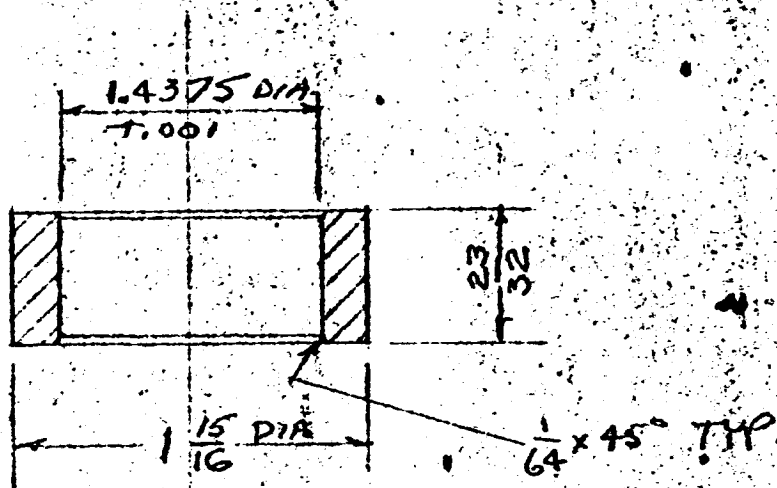
CYANIDE @ 1550° F

CASE DEPTH .010 - .015

OIL QUENCH

TEMPER @ 350° F - 1 HR.

FILE HARD



BY AS	DATE 25 MAR '65	TITLE
APR	DATE	

SPACER

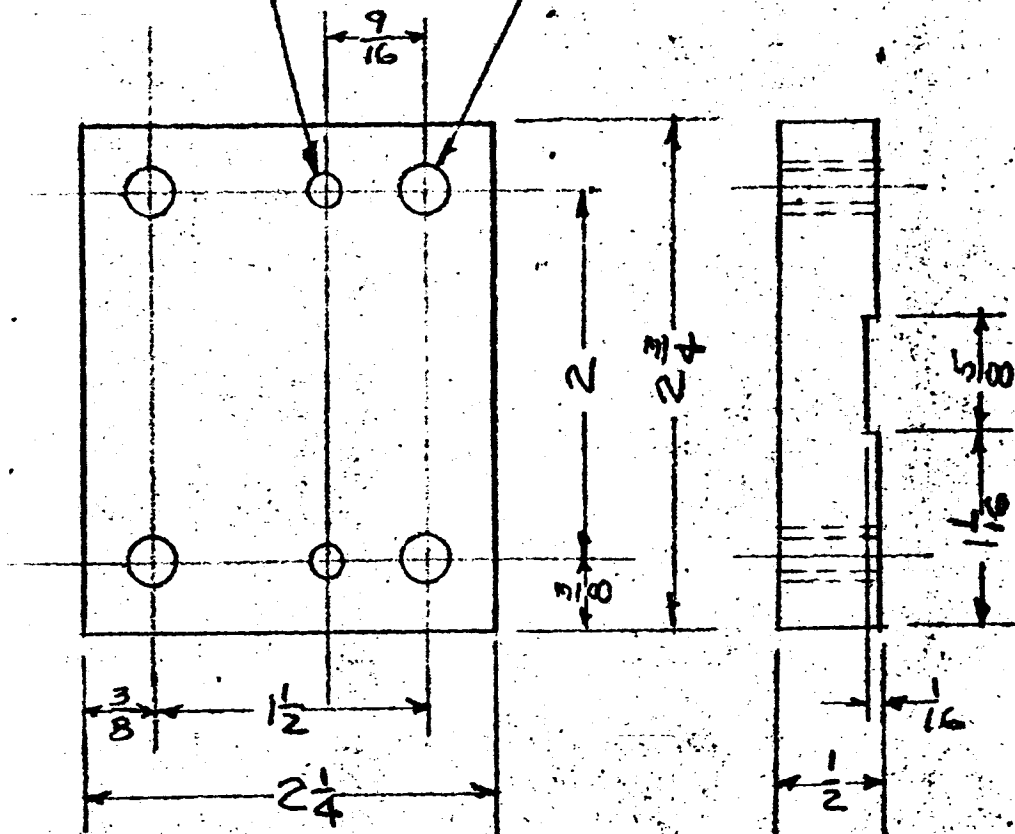
11374-108

MAT'L: - ALUM. ALLOY $\frac{1}{2}$ HARD.

ENGINEER'S SKETCH SHEET - FORM 2118

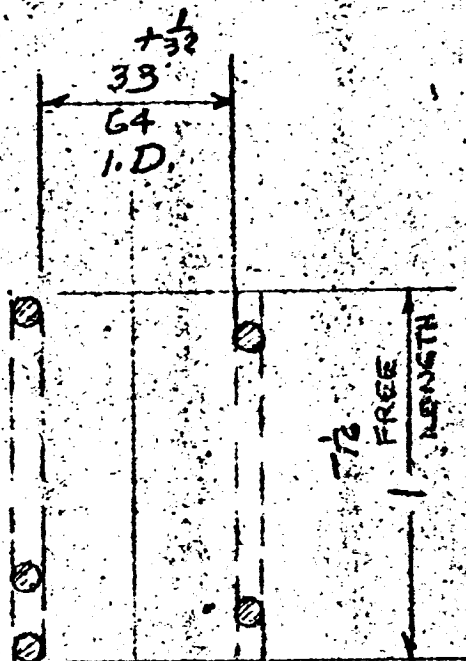
.1870-.0005
DIA.
2-HOLES

$\frac{17}{64}$ DR. THRU
4-HOLES



ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: 1080 MUSIC WIRE



ACTIVE COILS 5
TOTAL COILS 5
PLAIN ENDS.

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: 1095 ST'L

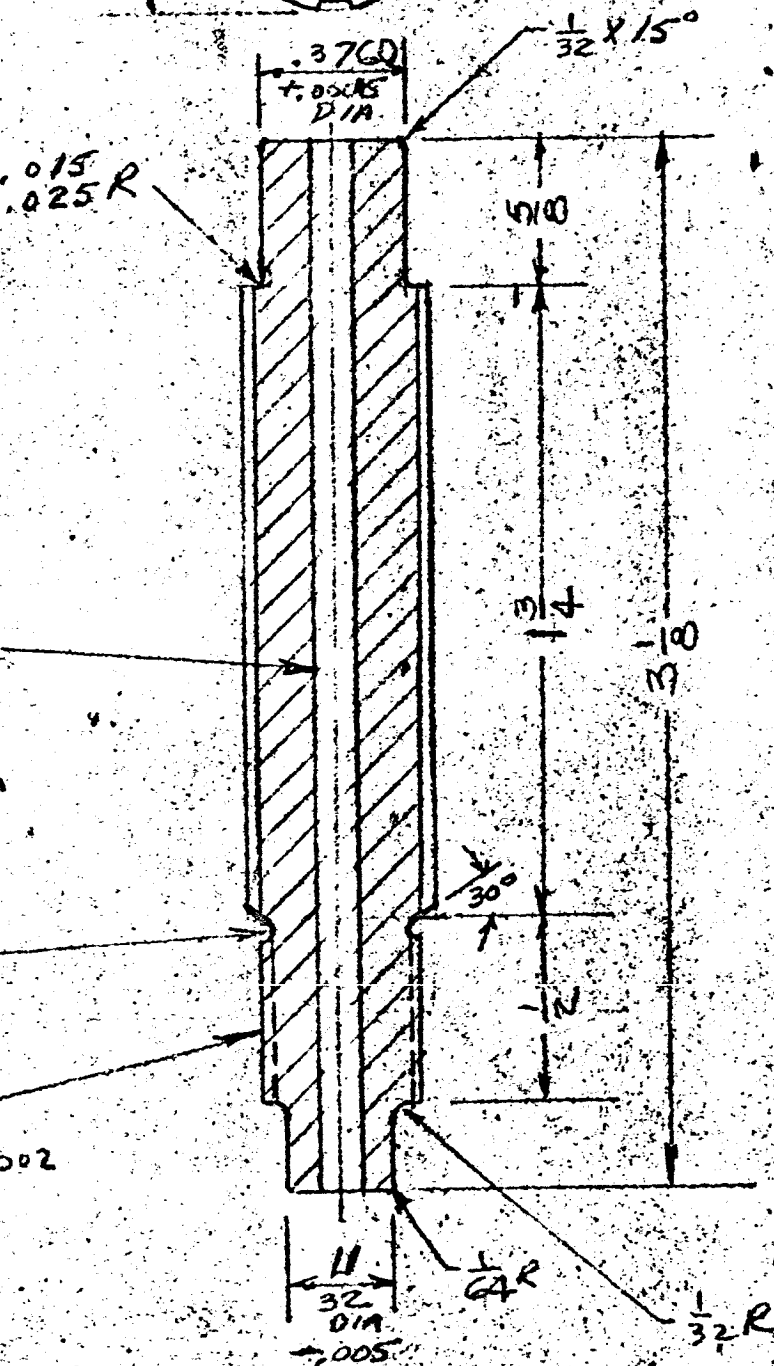
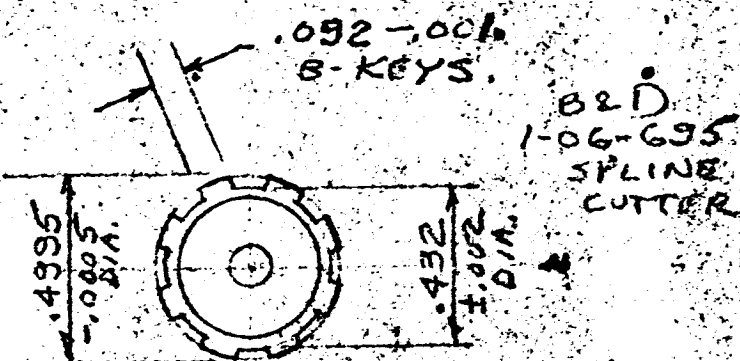
H.T.

HEAT @ 1550°F

QUENCH IN OIL

TEMPER @ 700°F MIN. 1-HR

Rc 43-48



#31 DR. (.120) THRU

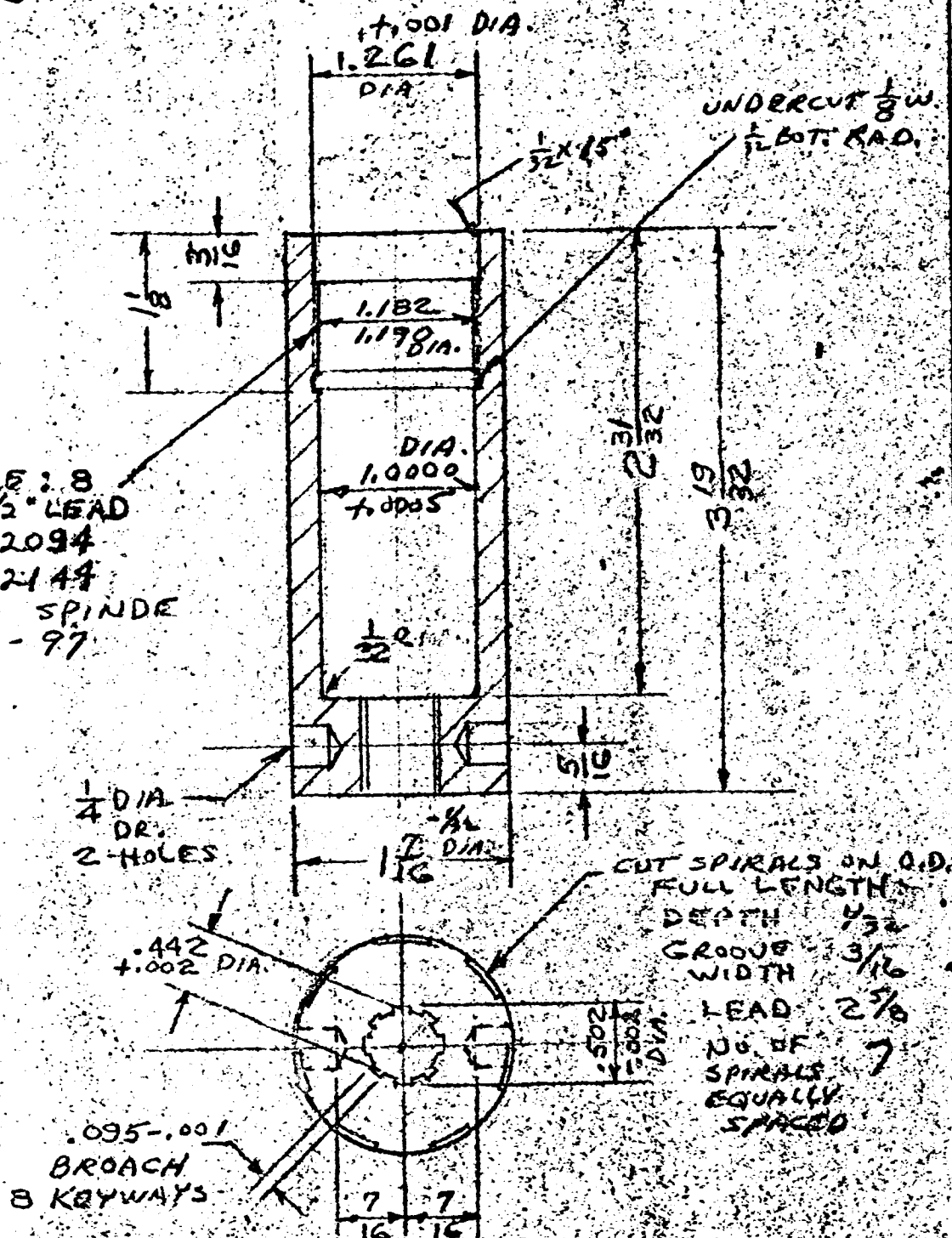
$\frac{1}{8}$ W UNDERCUT
 $\times \frac{1}{32}$ DIA.
 $\frac{1}{32}$ BOTTOM RAD

$\frac{7}{16} \times 14$ NG TH'D
TURN O.D. TO $.420 \pm .002$
BEFORE H.T.

BY AS	DATE 25 MAR '63	TITLE DRILL BIT SPLINE	1137A-111
APR	DATE		

HEAT @ 1550°F.
QUENCH IN 600°F. SALT
HOLD 40 MIN.
RC 45-50

TH'D MULTIPLE: 8 ✓
1 1/4 DIA. X 1/2" LEAD
P.D. 1.2094
1.2144
TO FIT ON SPINDLE
11374-97



BY AS	DATE	26 MAR '65
APP	DATE	

SPINDLE EXTENSION 11374-112

MAT'L 4140 STL

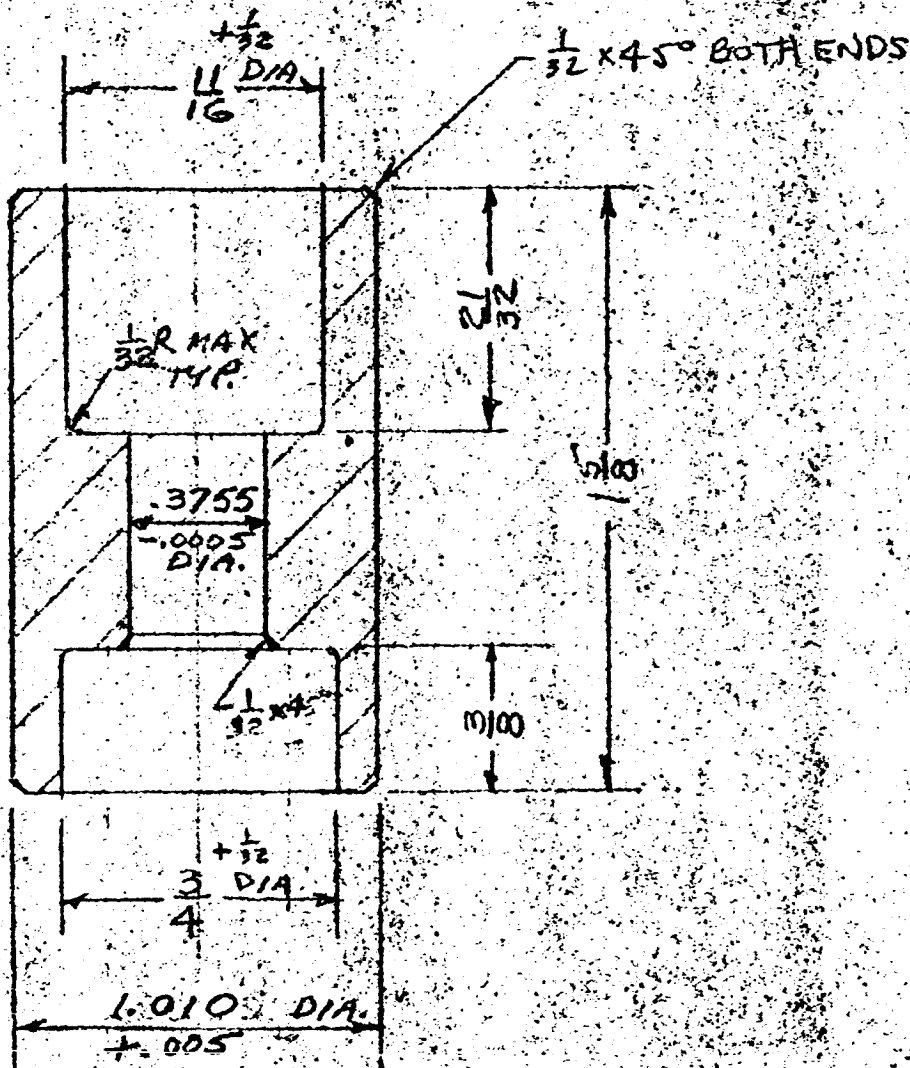
H.T.

HEAT @ 1550°F

QUENCH IN 450°F SALT

TEMPER @ 750°F MIN 1-HR

Rc 40-45



11374-H3

MAT'L: 1095 STL

HEAT @ 1550°F
OIL QUENCH
TEMPER @ 700°F MIN
1-HR.
RC 43-48

Technical drawing of a circular part. The top view shows a circle with a central hole. The diameter of the outer circle is 7/16. The diameter of the inner hole is 7/16. The side view shows a circular cross-section with a central hole. The diameter of the outer circle is 7/16. The diameter of the inner hole is 7/16. The drawing is labeled with dimensions 7/16 and 7/16.

UNDERCUT $\frac{1}{8}$ W
X $1\frac{5}{32}$ DIA
1 $\frac{1}{32}$ BOT. RAD

1.260
DIA

TH'D. MULTIPLE: 8
1 1/4" DIA X 1/2" LEAD
P.D. 1.2094
1.2056

TO FIT IN PERC. BIT
SHANK PC# 11374-81

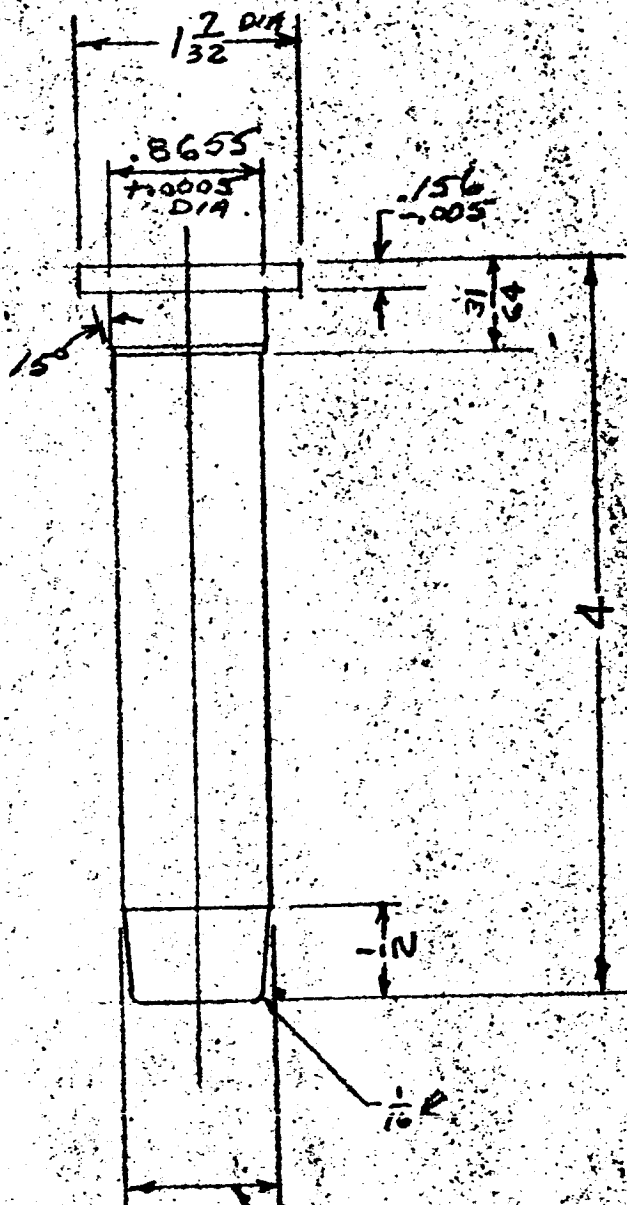
310R
(1/20)

7/16-14 N.C. TAP

BY AS	DATE 26 MAR 65	TITLE DR BIT END CAP	SKETCH 11374-114
APR	DATE		

MAT'L: ALUM. ALLOY 1/2 HARD

ENGINEER'S SKETCH SHEET - FORM 2118



PUSH FIT IN I.D. OF
AUX. SUPPORT COLUMN
(.834 DIA. NOMINAL)
PC # 11374-122

LUNAR NASA

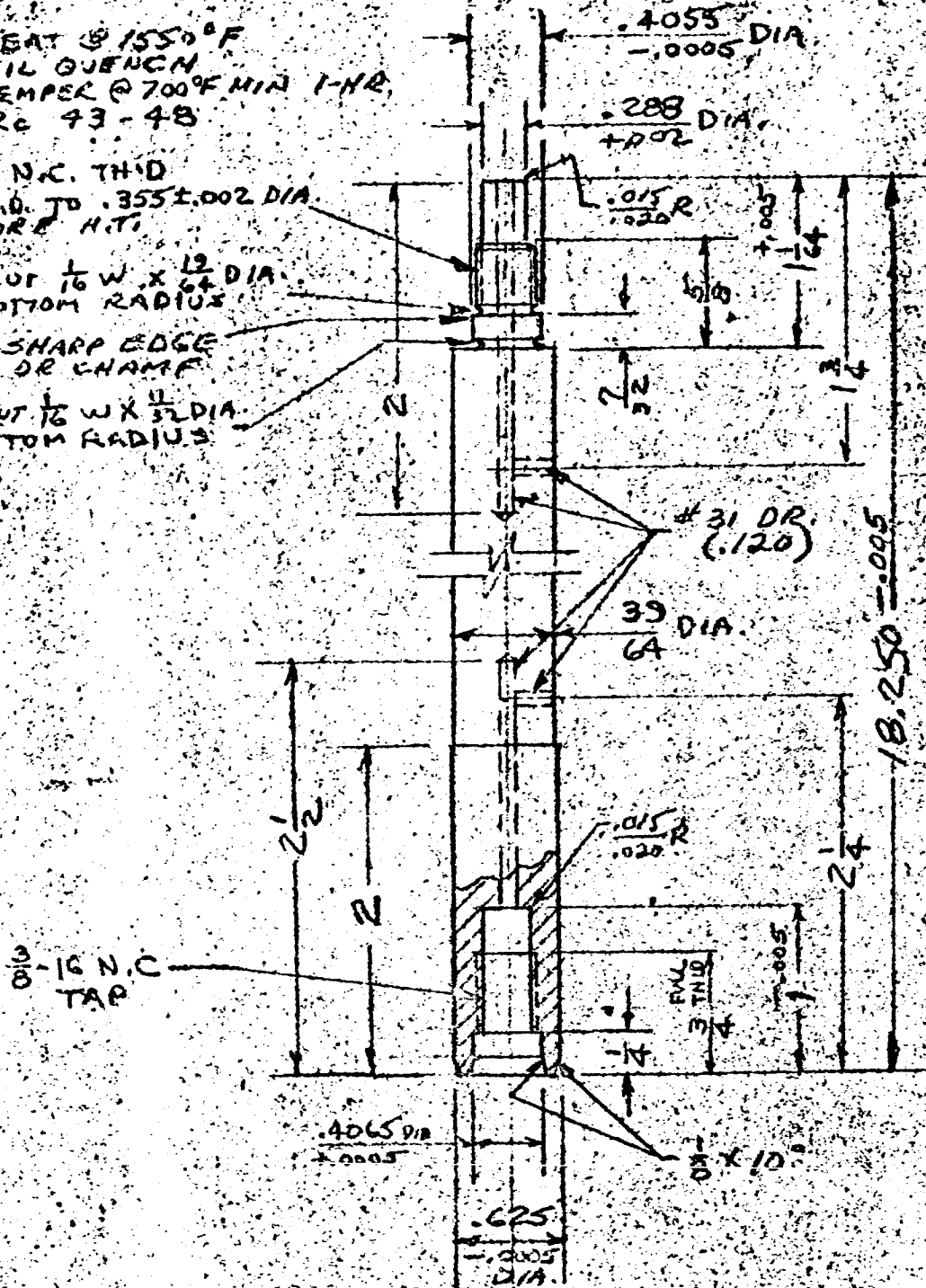
H.T. HEAT @ 1550°F
OIL QUENCH
TEMPER @ 700°F MIN 1-HR.
Rc 43-48

3-16 N.C. TH'D
TURN A.D. TO .355 ± .002 DIA.
BEFORE H.T.

UNDERCUT $\frac{1}{16}$ W. X $\frac{12}{64}$ DIA.
 $\frac{1}{32}$ BOTTOM RADIUS

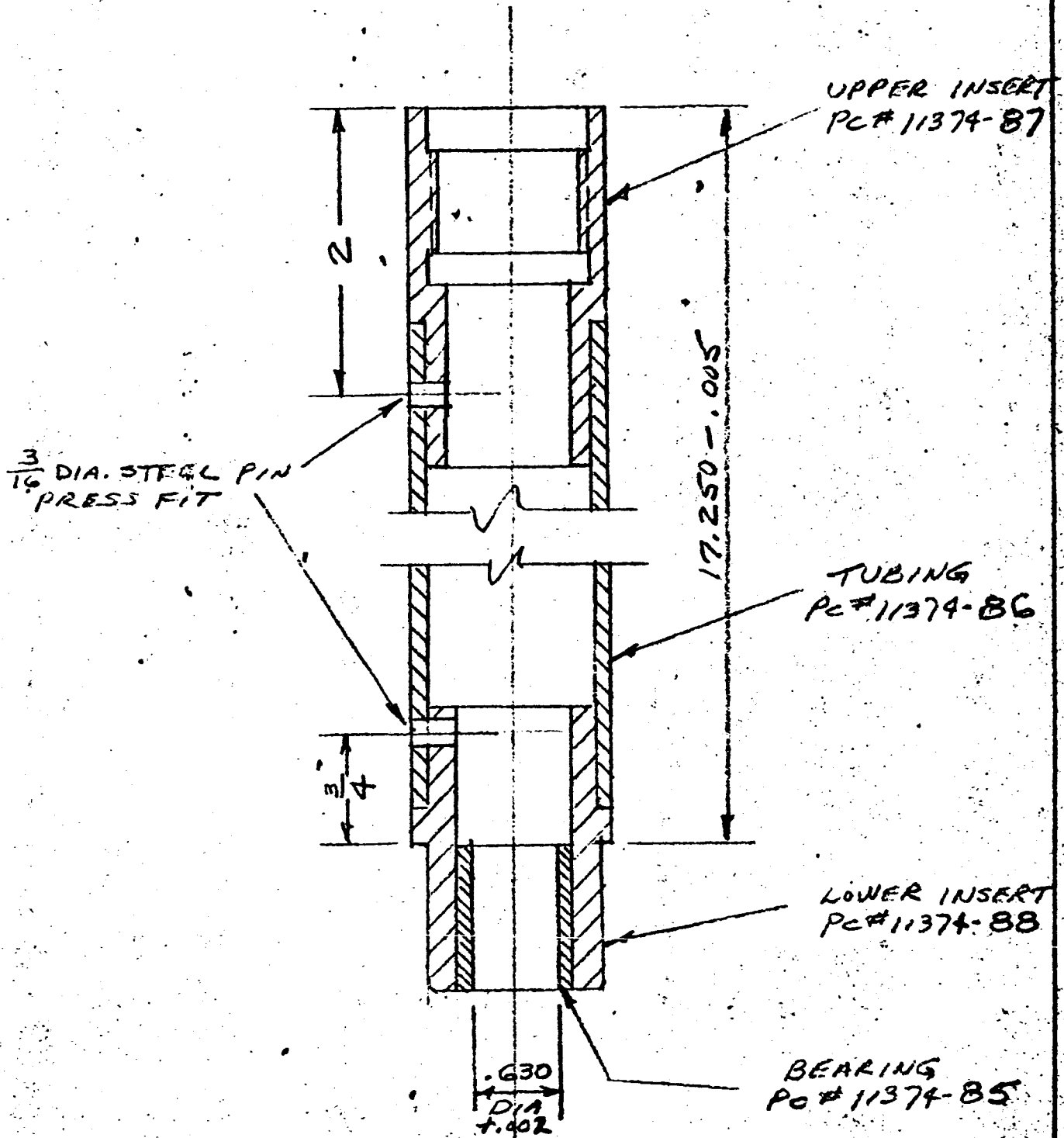
BREAK SHARP EDGE
GIVE DR CHAMF

UNDERCUT $\frac{1}{16}$ W X $\frac{11}{32}$ DIA.
 $\frac{1}{32}$ BOTTOM RADIUS



BY AS	DATE 29 MAR '65	TITLE	ROD EXTENSION	SERIAL	11374-116
APR	DATE				

ENGINEER'S SKETCH SHEET - FORM 2/18



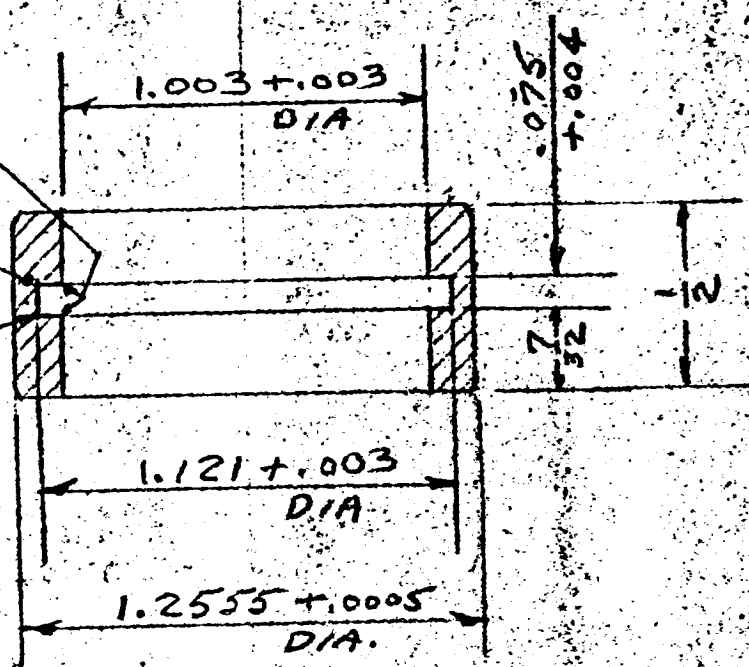
BY AS	DATE 9-JUN-83	TOTAL	BIT EXTENSION ASSY	11374-117
APR	DATE			

MAT'L: C.R.S.

ENGINEER'S SKETCH SHEET - FORM 2118

BREAK SHARP
EDGES .005
APPROX.

.005 R
.015



BY A-S
APR

DATE
DATE

1 APR 65

TITLE

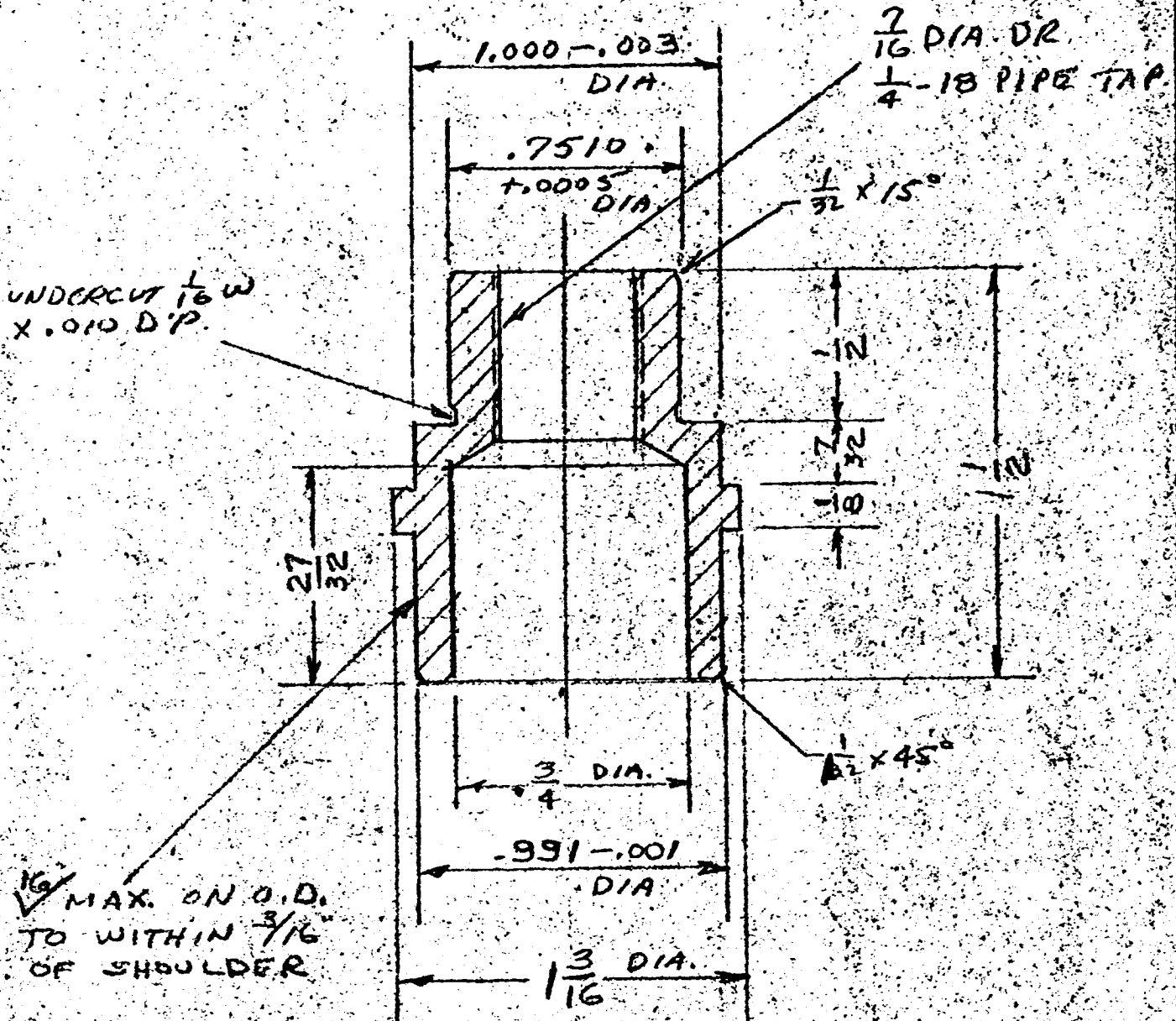
DEAL RETAINER

SKETCH

11374-118

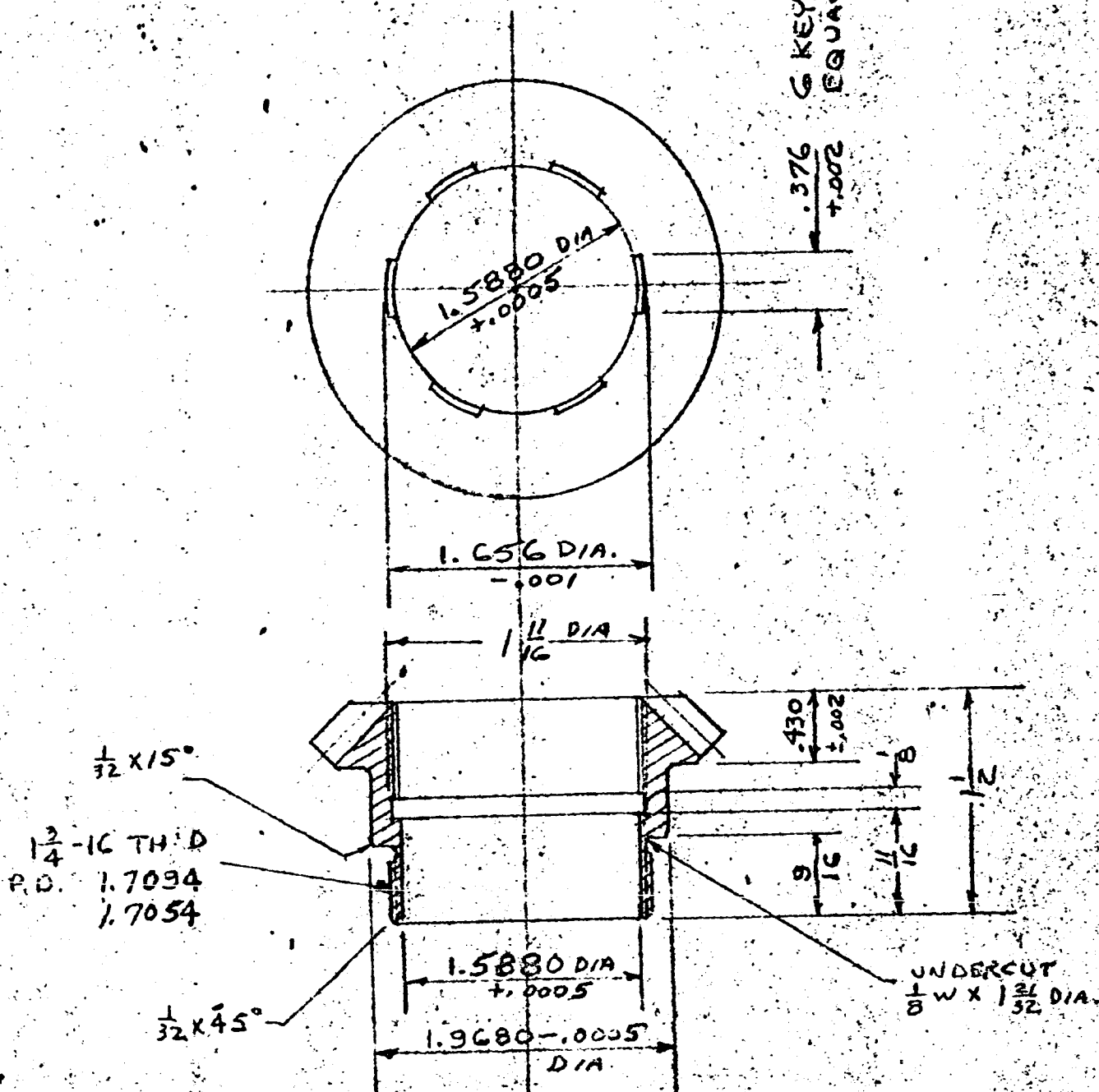
MAT'L CRS

ENGINEER'S SKETCH SHEET - FORM 2118



ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L L130 Y BOSTON
MITER GEAR



BY *AS*
APP.

DATE
DATE

5 APR. 65

TITLE

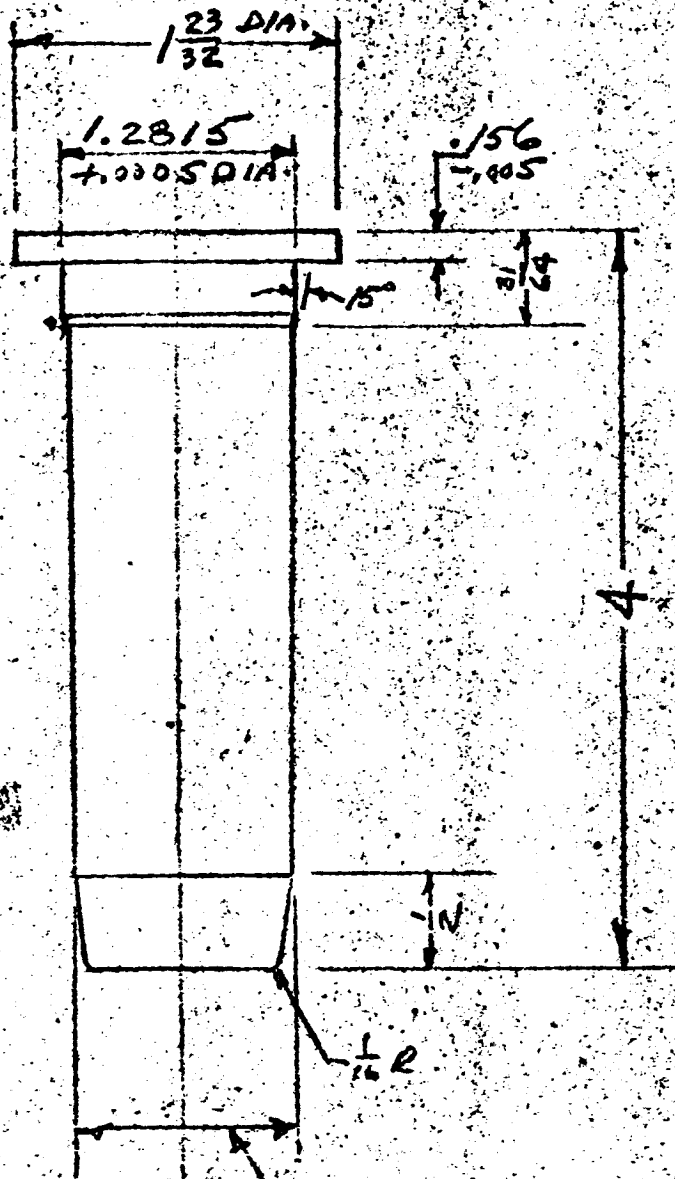
BIT DRIVE BEVEL GEAR

SKETCH

11374-120

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L :- ALUM. ALLOY 1/2 HARD MIN.



BY AS
APR

DATE
DATE

ASUNES

TITLE

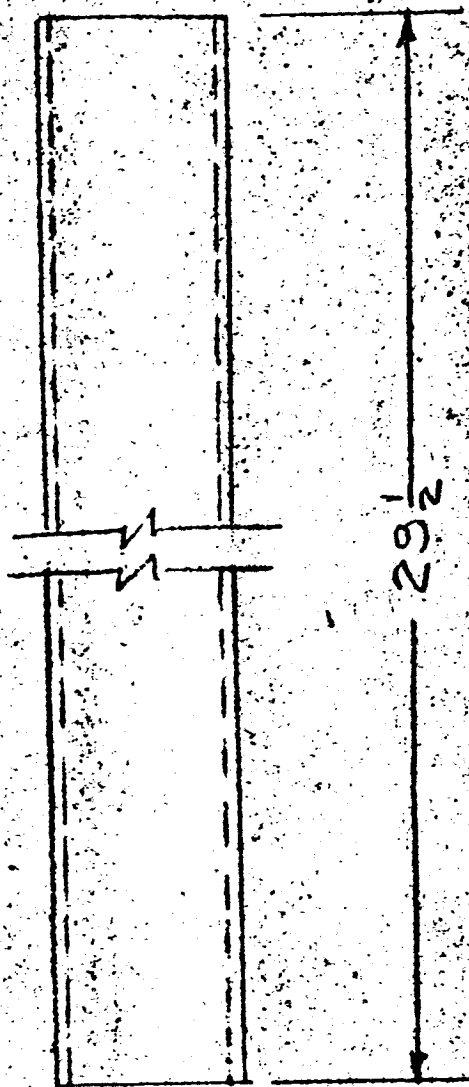
MAIN COLUMN POST

SKETCH

11374-121

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L 1- 1" O.D. X .083 WALL 6061-T6 ALUM. TUBING,
FINISH 1- .001 TO .002 MARTIN HARD COAT ON O.D.



BY HS	DATE 4 JUNE 68	TITLE AUX. SUPPORT COLUMN	PART NO. 11374-122
APP	DATE		

MAT'L: ETD-180

ENGINEER'S SKETCH SHEET - FORM 2118

TH'D MULTIPLE: 8

$1\frac{1}{4}$ DIA. X $\frac{1}{2}$ LEAD

P.D. 1.2094

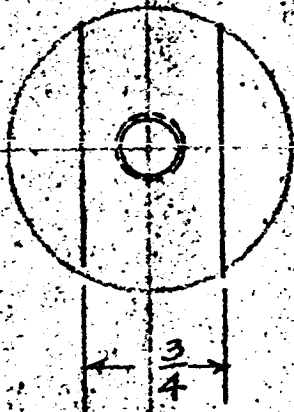
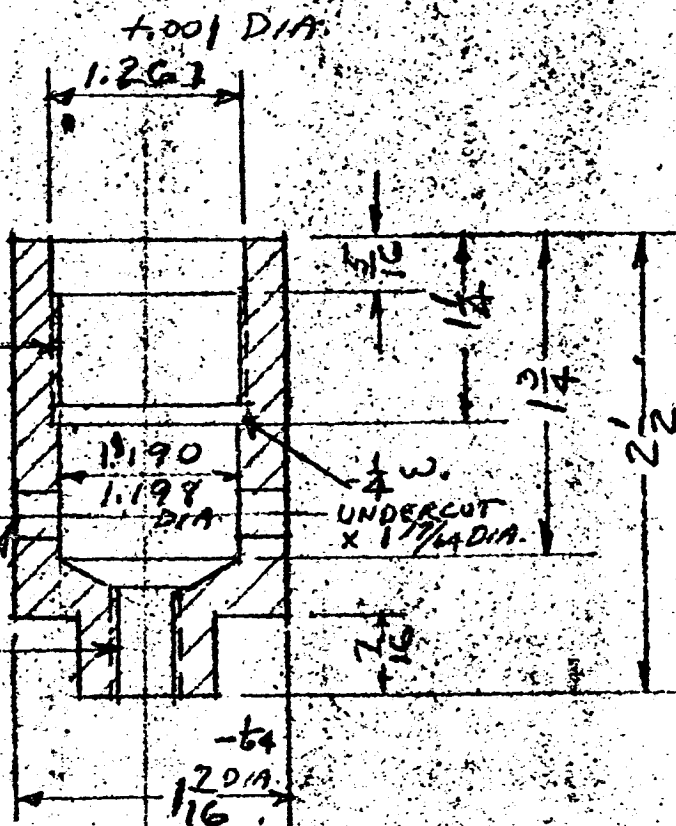
1.2144

TO FIT ON SPINDLE

PO# 11374-97

$\frac{3}{8}$ - 24 N.F.
TAP.

$\frac{1}{4}$ DIA. DR.
THRU ϕ



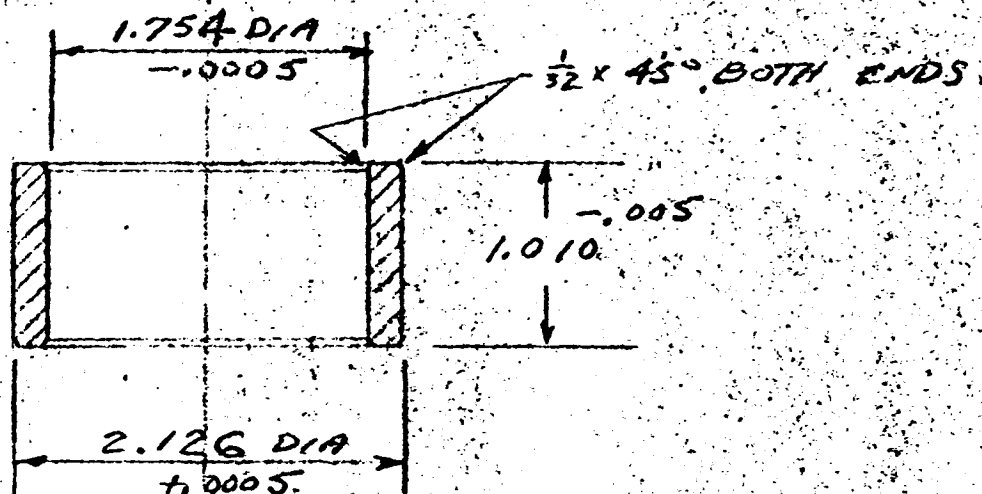
BY: A.S. DATE: 15 APR 65
APR DATE:

TITLE: CHUCK ADAPTOR

SKETCH: 11374-123

MAT'L: - SINTERED BEARING IRON

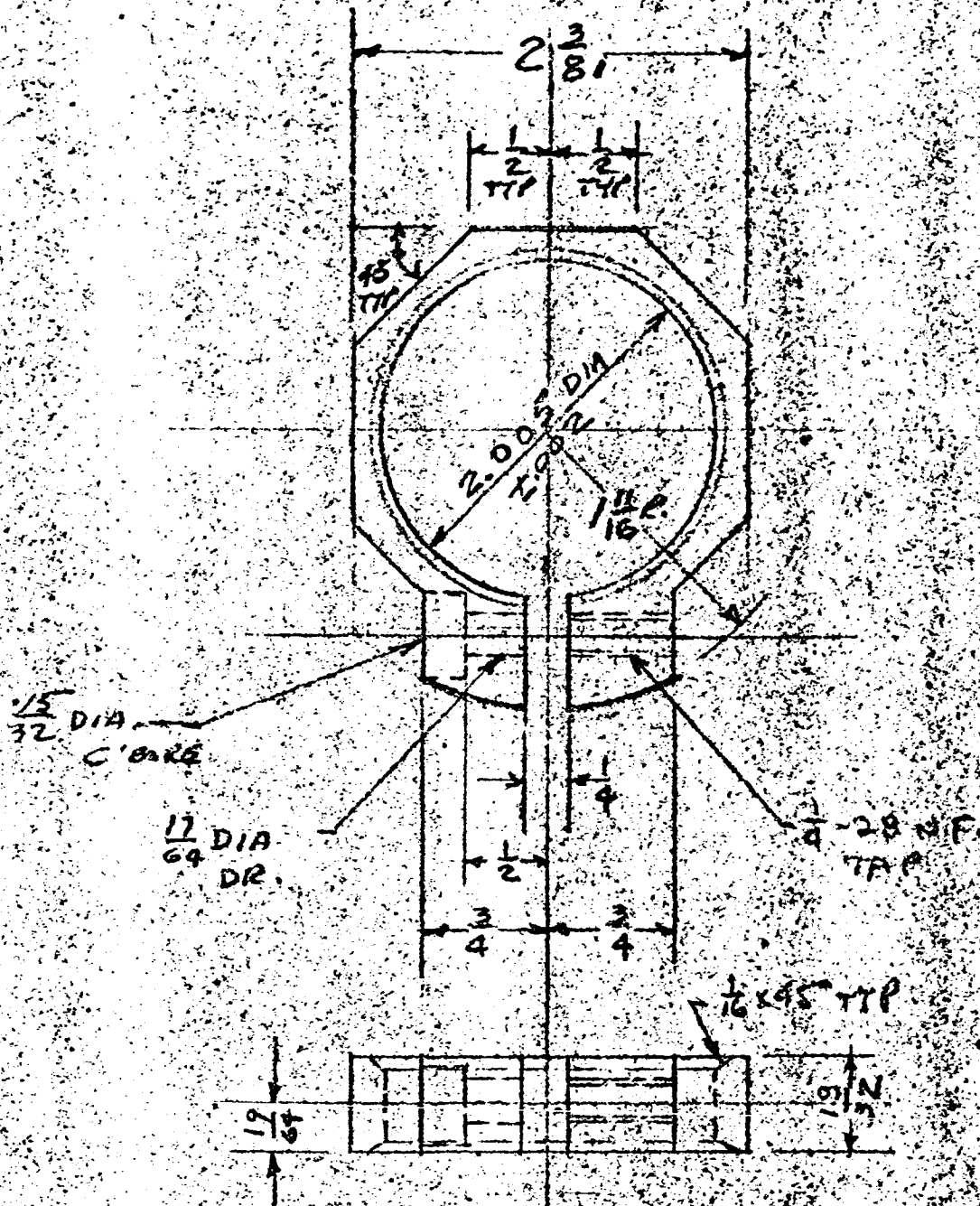
ENGINEER'S SKETCH SHEET - FORM 2118



BY A.S.	DATE 19 APR 65	TITLE UPPER BEARING	SKETCH 11374-124
APR	DATE		

MAT'L - ALUM. ALLOY $\frac{1}{2}$ HARD

ENGINEER'S SKETCH SHEET - FORM 2118



BY: AJS
APP:

DATE	19 APR '65
DATE	

TITLE

COLLAR

945715

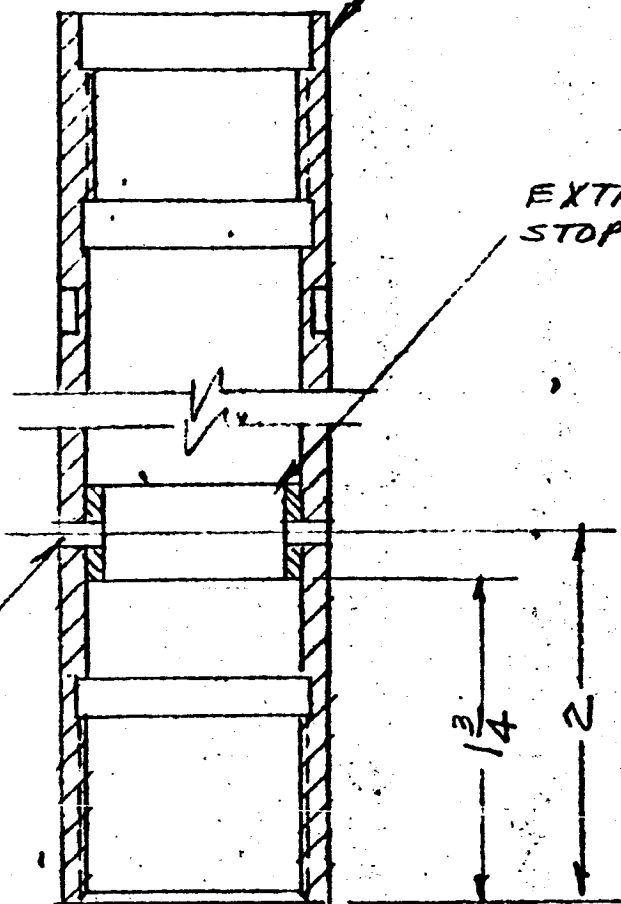
11374-125

ENGINEER'S SKETCH SHEET - FORM 2118

PERC. BIT SHANK
PC # 11374-81

EXTR. BUSHING
STOP PC # 11374-79

$\frac{1}{8}$ DIA. STEEL PIN
PRESS FIT
2 REQ'D EQUALLY
SPACED



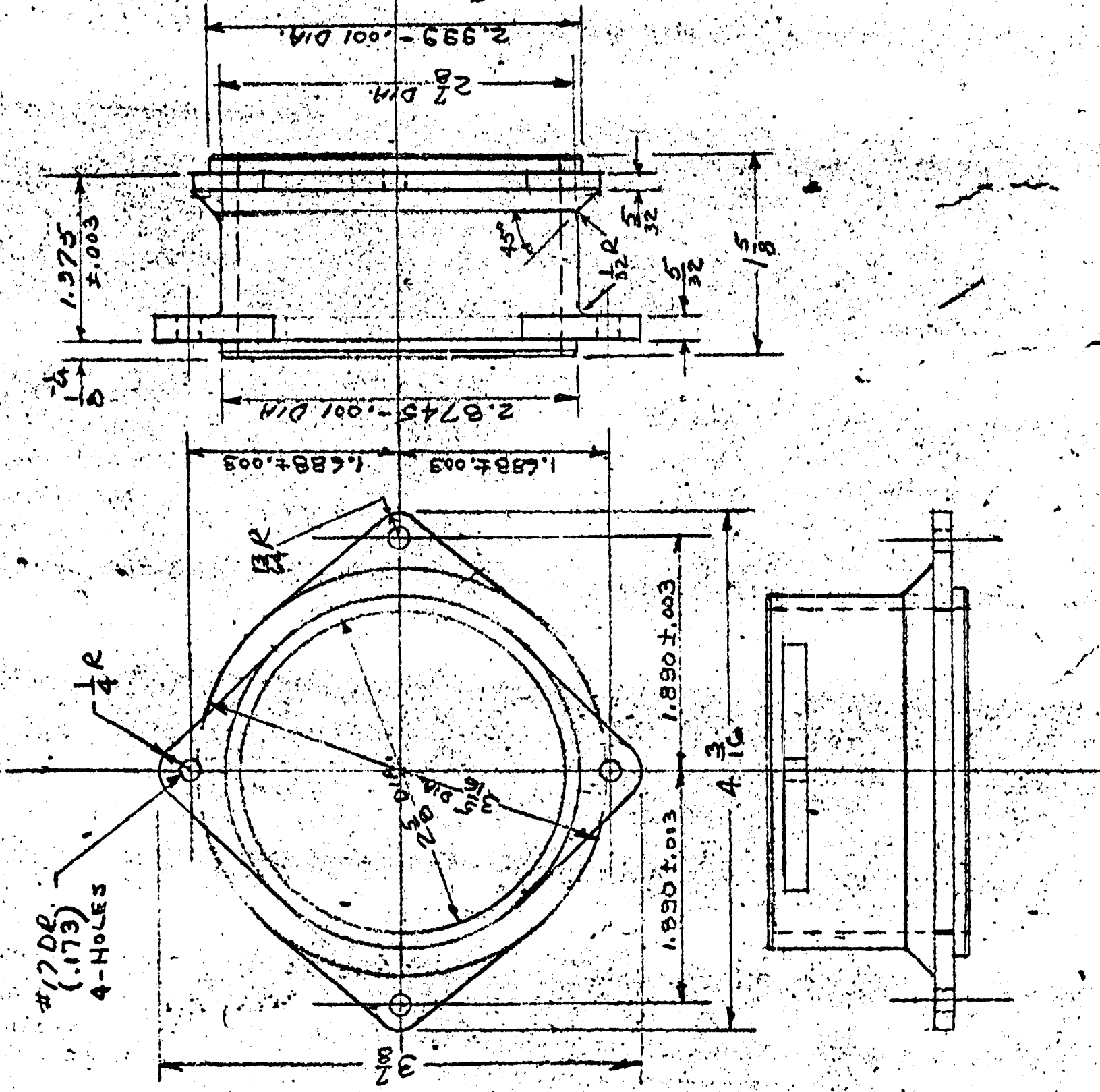
BY	A-S	DATE	10 JUNE 65
APR		DATE	

TITLE	PERC. BIT SHANK ASS'Y	PC #	11374-126
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MAGNET HOUSING SPACER

11374-127

MAT'L ALUM. ALLOY $\frac{1}{2}$ HARD



LUNAR NASA

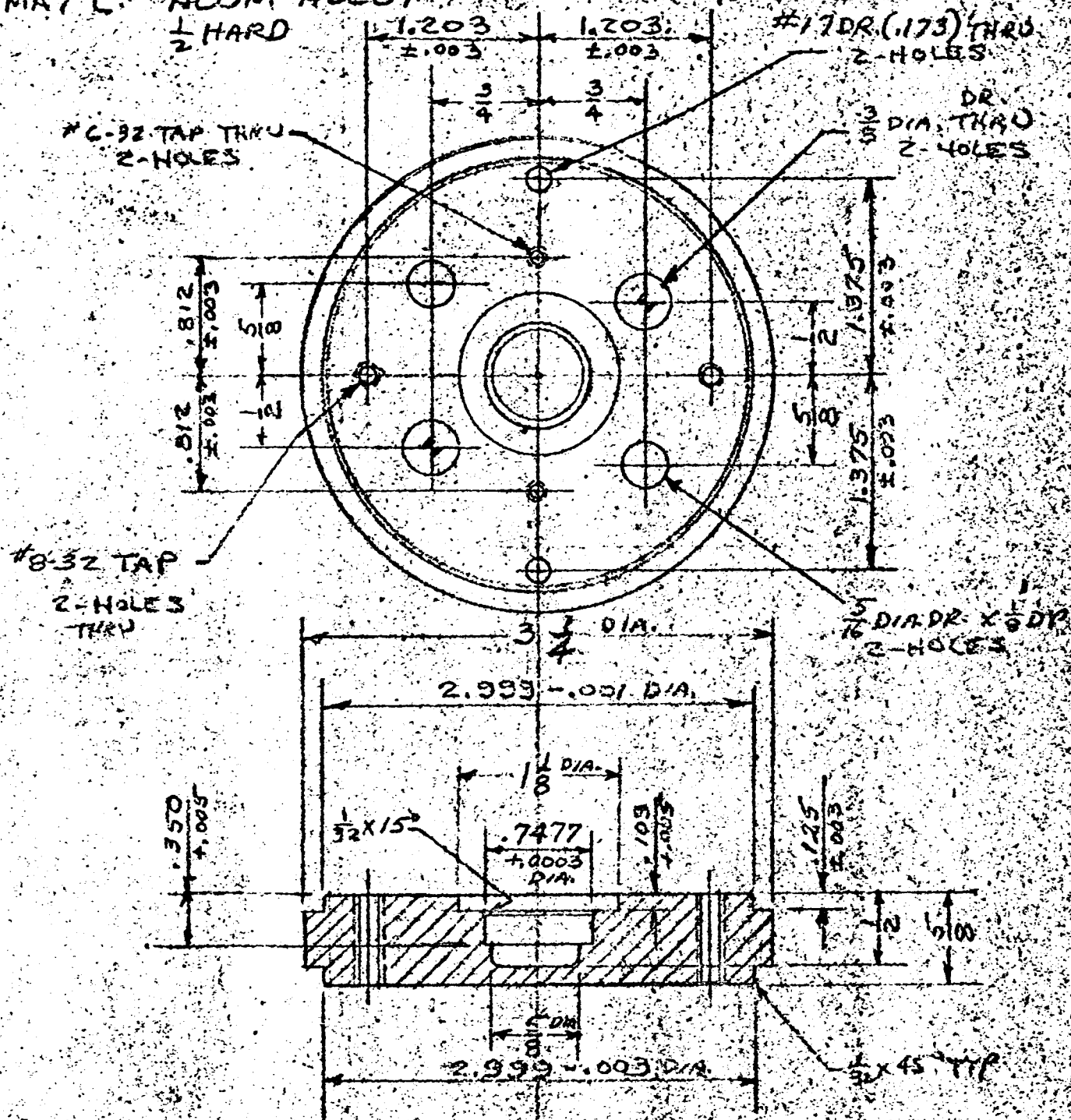
AS. 22 APR '65

THE BLACK & DECKER MFG. CO. TOWSON, MD

ENGINEER'S SKETCH SHEET - FORM 2118

MAT'L: ALUM ALLOY

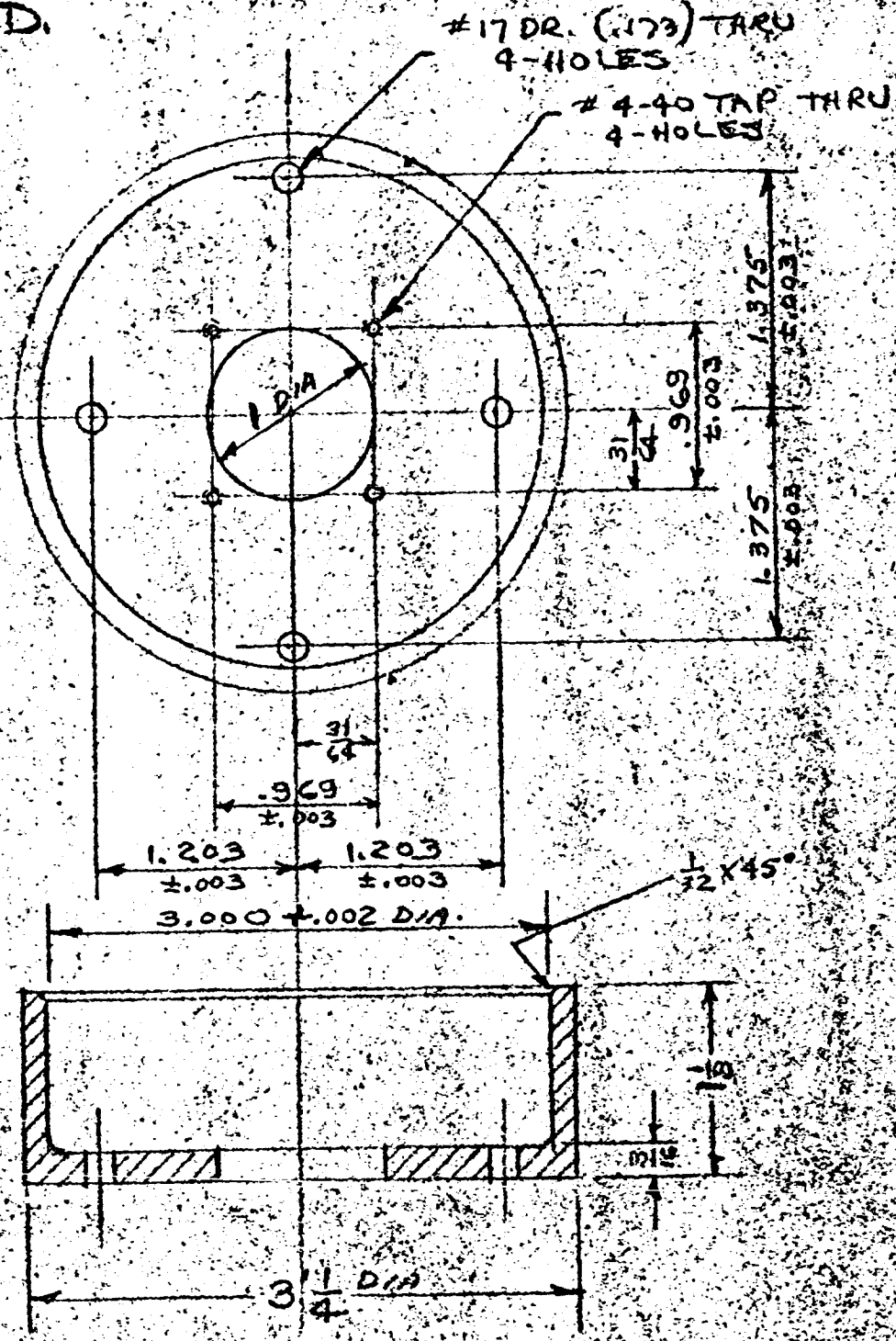
$\frac{1}{2}$ HARD



11374-128

ENGINEER'S SKETCH SHEET - FORM 217B

MAT'L: ALUM. ALLOY.
 $\frac{1}{2}$ HARD.

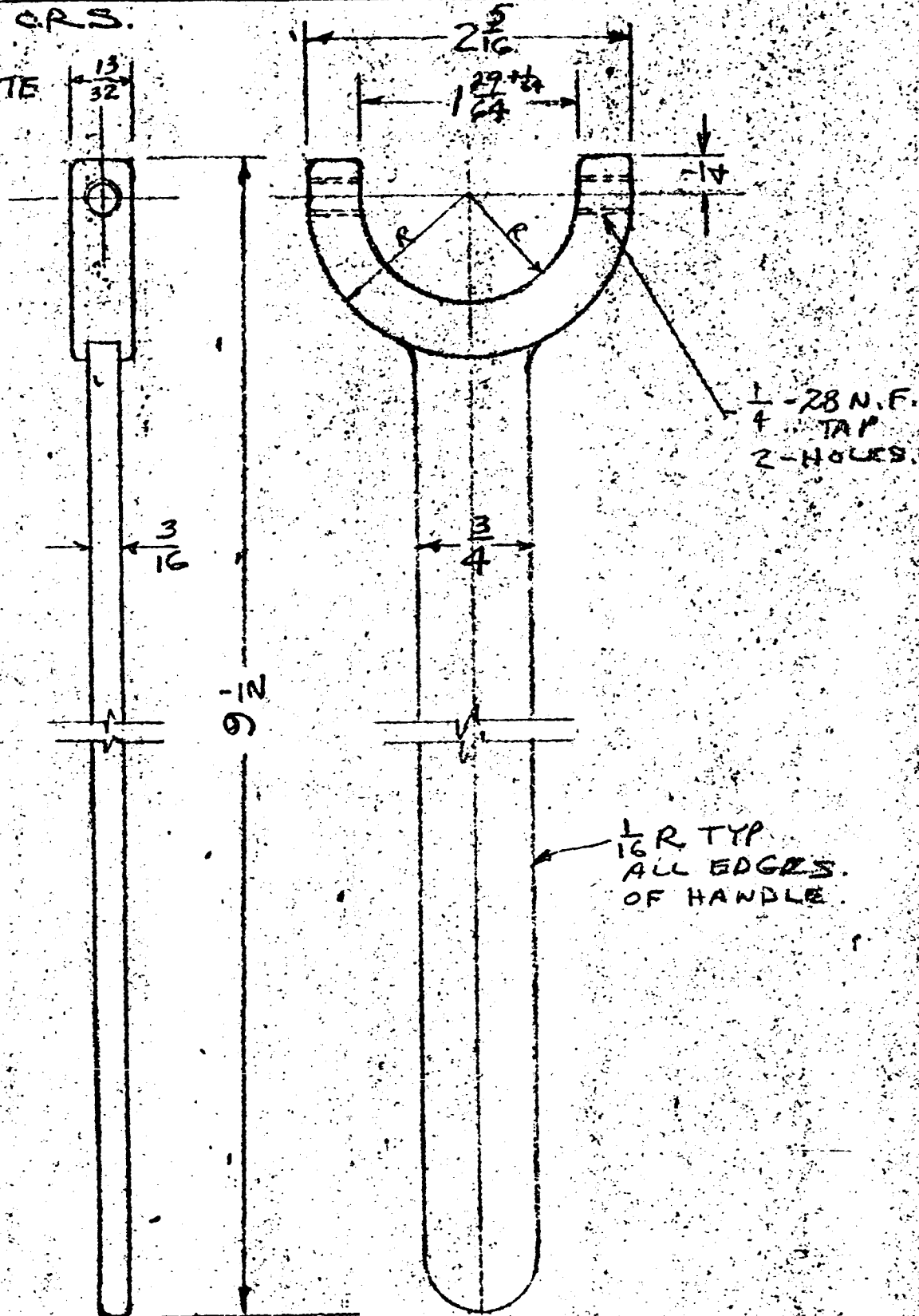


-129

BY AS	DATE 22 APR '65	TITLE RECEPTACLE HOUSING	SKETCH 11374-1
APR	DATE		

ENGINEER'S SKETCH SHEET - FORM 2/18

MAT'L: - CRS.
FINISH: -
PENTRATE

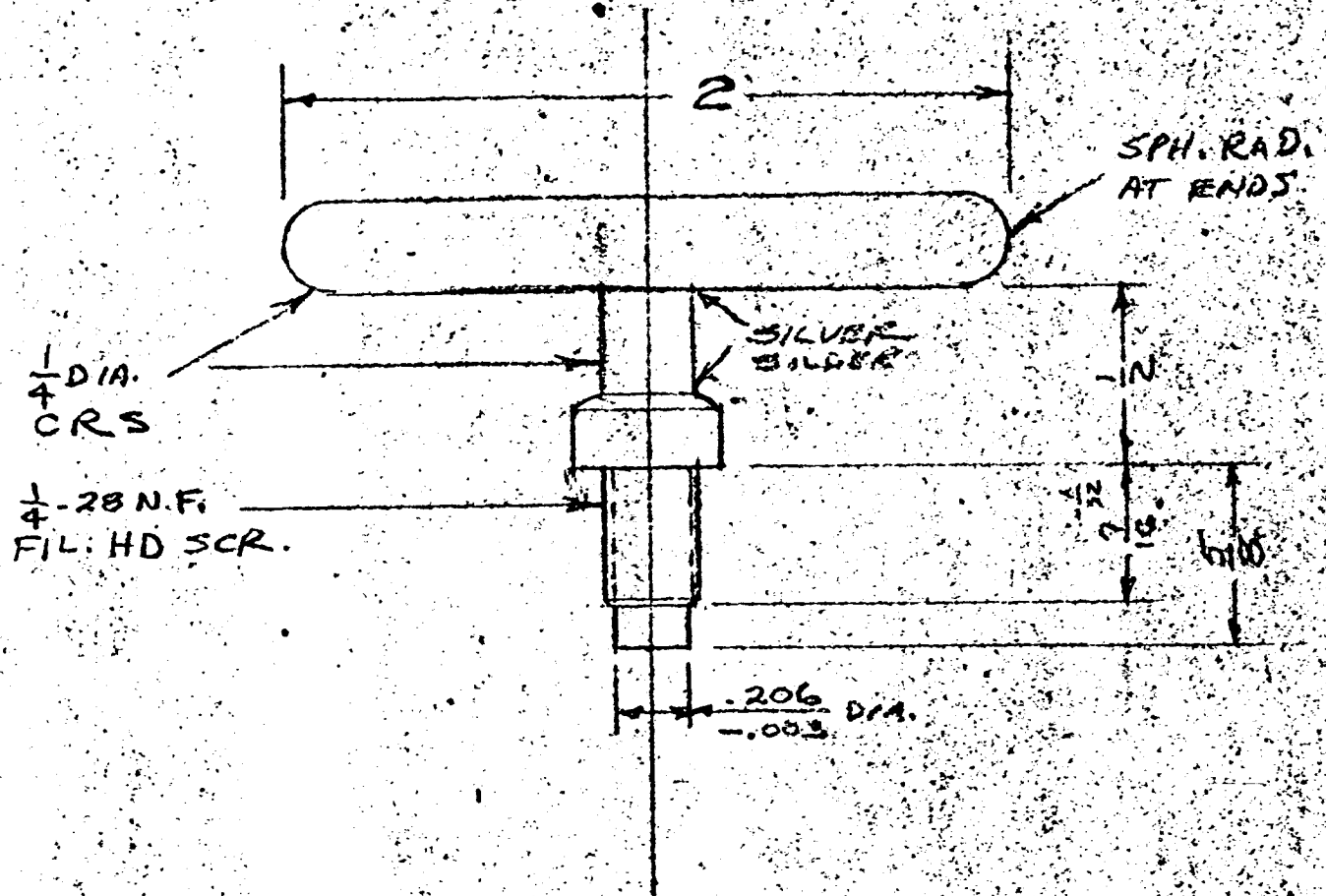


BY A.S. DATE 23 APR '65
APR DATE

TITLE UNCOUPLING WRENCH

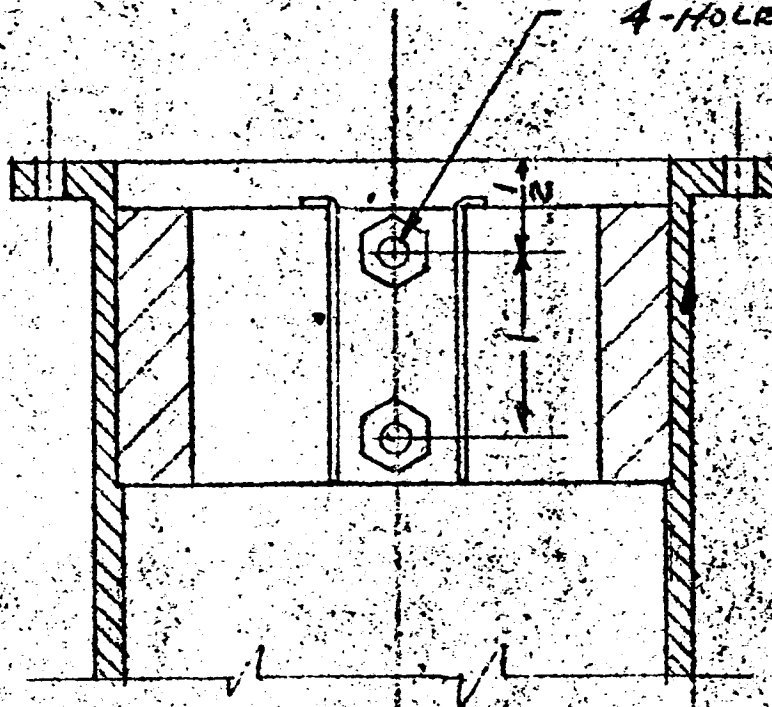
SKETCH 11374-150

ENGINEER'S SKETCH SHEET - FORM -



ENGINEER'S SKETCH SHEET - FORM 2/18

#17 DR. (173)
4-HOLES ON ASSY.



MAGNET RET. (2)
BKT.
PC # 11374-84

MAGNET HOUSING
PC # 11374-90

MAGNET (2)
SEGMENT
PC # 11374-82

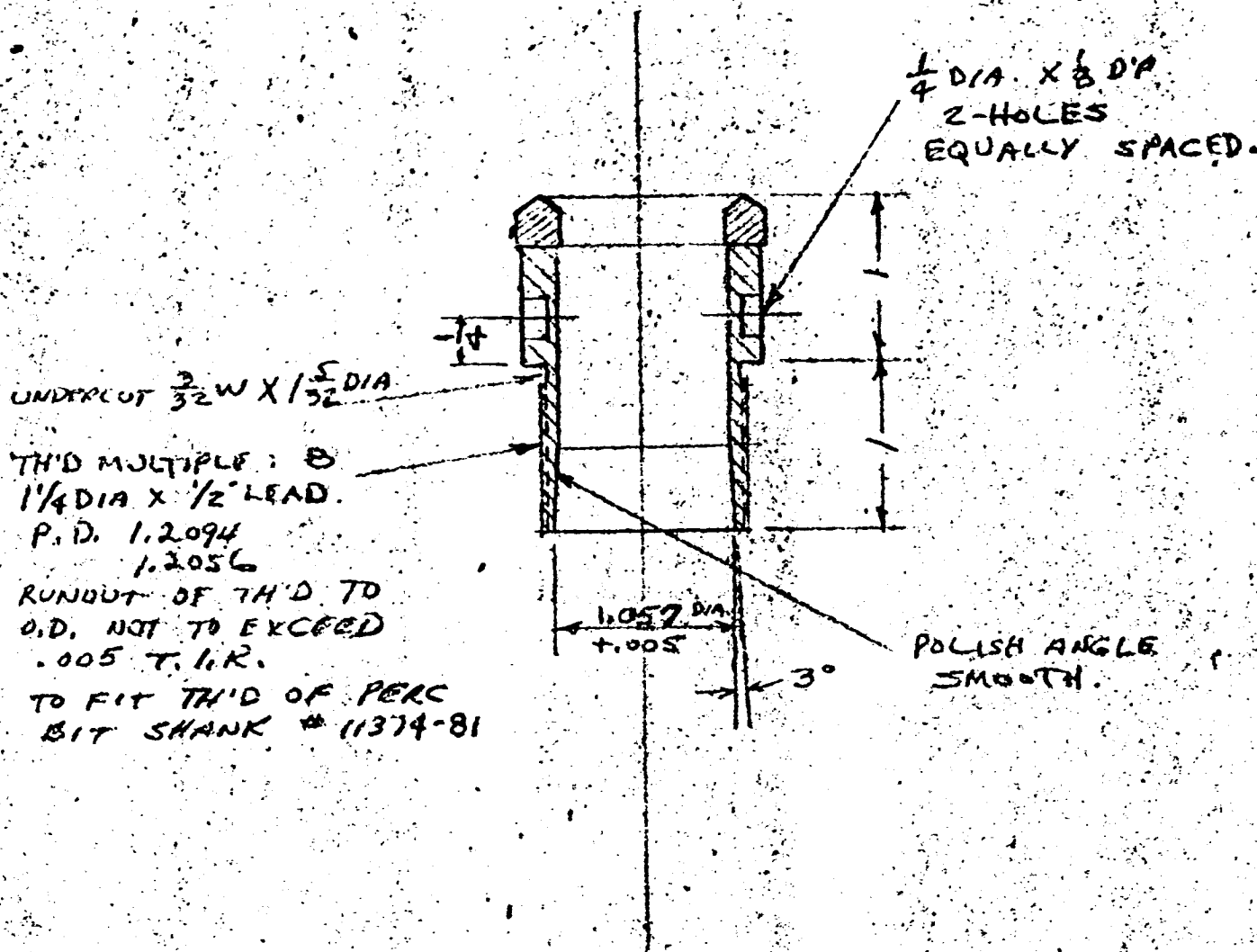
CEMENT MAGNETS
TO HOUSING WITH
ECCOBOND 26

8-32 X 1/2 FL HD H.S.
LOCK WASHER & NUT (4)

BY ACS	DATE 4 MAY 65	TITLE MAGNET HOUSING ASSY	FILE # 11374-132
APR	DATE		

MAT'L: BLANK & DECKER CAT NO. 55998
1 1/2" CORE DRILL

ENGINEER'S SKETCH SHEET - FORM 2118



MAT'L: C 1215 S7L

CYANIDE @ 1650°F
CASE .003-.006
OIL QUENCH
TEMPER 350°F
FILE HARD

ENGINEER'S SKETCH SHEET - FORM 2118

